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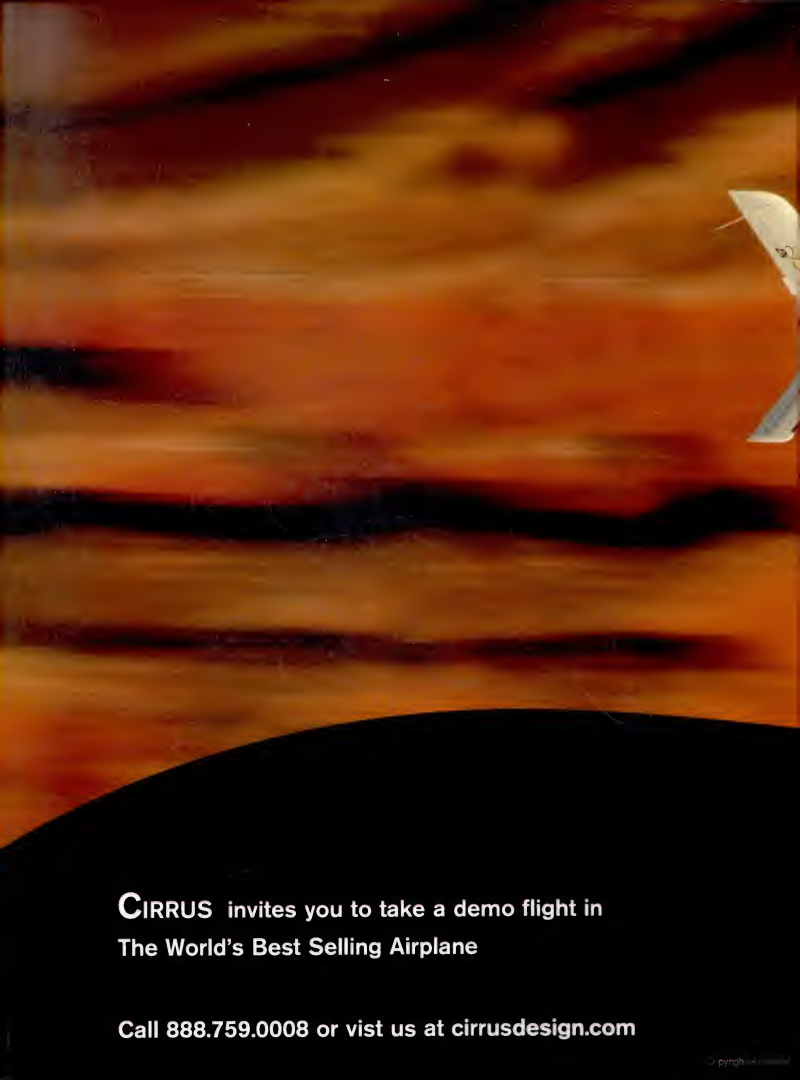
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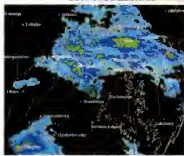
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Paul Bowen photographed the Cessna Citation CJ for our cover story. The new CJ1+ is the third iteration of the Cessna model 525 that began life as the CitationJet in 1993. In 2000 the airplane was upgraded to the CJ1 with new Collins Pro Line 21 avionics, and in the same year the larger more powerful CJ2 joined the family. Now, both airplanes have been renamed "+" and have more powerful engines and an advanced Pro Line 21 flight deck.



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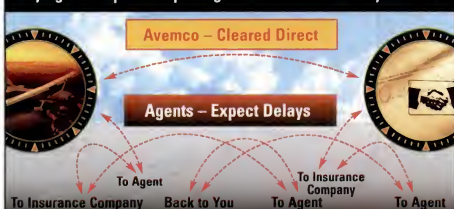
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Left Seat



By J. Mac McClellan
EDITOR-IN-CHIEF

What Should Cessna Build Next?

It's no secret that Cessna is working on a new piston single. Cessna boss Jack Pelton told single-engine dealers last fall that a new airplane was coming. Jack and I even discussed potential new designs at length several months ago. Jack bought the martinis that I drank, and I think

he listened, but by the end of the evening I was suggesting, as I remember it, a biplane pusher configuration made from injection molded plastic, so I'm sure he gave up by then.

What Cessna hasn't revealed, in bars or otherwise, are any details of what a new piston single may look like. There have been hints that a new airplane would not replace any of the three models—the 172, 182 and 206—currently in production. Jack did tell me that preliminary work had begun in Cessna's engineering lab, but whatever timetable or other targets exist for the project remain a company secret.

So, with no facts other than confirmation that Cessna is working on a new piston single, we are all free to speculate and offer more suggestions that Jack and his team can ignore.

The first and most obvious design choice in this case is should the new Cessna have a high or low wing. Low-wing airplanes seem to have won that war a long time ago with nearly all high-performance singles having wings on the bottom. But, Cessna has built more airplanes than every other general aviation manufacturer put together, and all the Cessna singles that I can think of, except

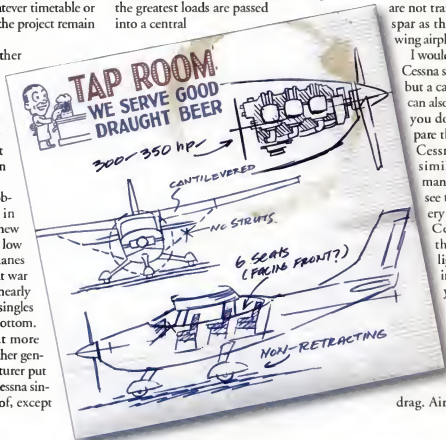
for a few crop dusters, have the wings on the top. A high-wing design is as powerful a trademark of a Cessna airplane as the name itself. However, given the dominance of low-wing singles, it would seem that the choice is a slam dunk with no advantages left for the high-wing airplane. But that's not true.

One of the most important assets of a high-wing design is the efficiency of the structure, particularly with a strut-braced wing. By efficiency, I mean the weight of the airframe. With the wing at the top the greatest loads are passed into a central

frame, which conveniently falls in the right place to be the forward cabin door frame, which needs to be a reinforced structure in any case. Those wing loads are transmitted down the door frame to the bottom of the fuselage where the strut is attached. Positive wing loads are applied in tension to the strut, and airplane building materials have much greater strength in tension than compression so the strut is strong, but light. The strong main door frame is also useful for absorbing landing gear loads that are not transmitted to the wing spar as they are on most low-wing airplanes.

I would be surprised if a new Cessna single had wing struts, but a cantilevered high wing can also be built very light. If you don't believe me compare the empty weight of a Cessna 210 to singles of similar size from other manufacturers and you'll see that the 210 wins every time. Actually, every Cessna model I can think of has had the lightest empty weight in its category over the years, and the high wing is part of that weight control.

The high wing can also be more aerodynamically efficient in terms of drag. Airflow over the top of



Left Seat

any wing is more complicated to manage than air passing beneath the wing. But in a low-wing airplane, the fuselage is smack in the middle of the upper wing surface, forcing airflow over the wing to diverge from a steady path toward the trailing edge. Aerodynamicists have become adept at minimizing drag caused by the presence of a fuselage on top of a wing, and you can see their work in the very complicated shapes of fillets and fairings of recent designs, but the high wing

avoids many of those complications and can be inherently lower in drag.

A high wing also delivers, in general, greater static stability, meaning the airplane tends to remain straight and level with less pilot input. Powerful static stability would be a bad thing in an aerobatic airplane or a fighter where maneuverability is itself a primary design goal. But in the kind of transportation flying most of us do, static stability reduces pilot workload, particularly when flying on in-

struments. Low-wing airplanes can enhance static stability by adding dihedral to the wing, and using other techniques, but the high-wing design comes by more of it naturally.

Landings can be more predictable, particularly short field landings, with a high-wing design because the ground effect cushion is less powerful. A low-wing airplane, particularly one with short landing gear, entraps a cushion of air between the wing and runway and can cause the airplane to float for considerable distances if approach speed and pilot technique are less than optimum.

A high wing also has some non-aerodynamic benefits such as keeping you dry when it rains; you can park your car under it in the T-hangar; the high wing can pass safely over a snow bank on a narrow taxiway; and you can get a better look down at the earth passing below you.

There are disadvantages to the high wing such as the need to climb up to add or check fuel and limitations on landing gear placement. With a carbureted engine, having the fuel up high eliminated the need for fuel pumps as gravity did the work, but with fuel-injected engines, as Cessna will certainly use in the new airplane, a pump is needed in any case. The landing gear complications of a high-wing design are restricted to retractable gear operation. No matter how you do it, the retracted gear goes into the fuselage taking up valuable space. The retractable gear on the singles Cessna has built in the past is just about as simple as a high-wing gear system can be, but still occupies fuselage space. The only way to get the gear out of the fuselage is to put pods on the outside like Lockheed did with the C-130, or Mitsubishi did with the MU-2s with the long body.

So, for all of these reasons—the most important being 80 years of tradition—I bet the new Cessna will be a high wing. But I don't think it will have wing struts or retractable landing gear.

How many seats do you want? Six is my guess. Nobody wants to be in any kind of vehicle where every seat is filled, at least not for very long. Think middle row of coach in an airliner. So when two couples fly, or a couple with two kids, the greatest luxury is having seats you don't use for people, which then become available for other stuff. And a six-seat cabin doesn't add much drag over a four-seater because the frontal area, which is unchanged, is a greater drag producer than the length of



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Left Seat

the fuselage. If you don't believe me fly a six-seat A36 Bonanza against the four-seat F33A. If you use your imagination you may find a knot or two speed edge for the shorter F33A, but no more than that.

Next question: Metal or plastic? The answer for Cessna should absolutely be aluminum. If it was starting from scratch a composite airframe could make sense, but with so many decades of experience in building metal airframes Cessna would be nuts to switch to composites. In piston singles the composites are working well for Cirrus, Columbia, Diamond and others, but so far those airplanes are not lighter than Cessna's metal airframes.

Finally, how much power should Cessna bolt on the nose? As much as Lycoming or Continental will deliver, I say. I would expect Cessna to stay with Lycoming given the common corporate parentage, but it has used many thousands of Continental engines over the years. Continental's cross flow cylinder head IO-550 series engines are producing prodigious amounts of power, well above the 310-horsepower rating and could churn out an easy 350 horsepower in a turbo version. Lycoming, I'm confident, can up the power ante, too. What we have seen conclusively from Cirrus and Columbia is that lots of power on an efficient fixed-gear airframe can produce cruise speeds that rival or exceed retractable gear singles, and that's what pilot's insurance companies want—fixed landing gear.

Bottom line, I expect the new Cessna to be a high-wing, fixed-gear single with six seats, more than 300 horsepower, at least 100 gallons of fuel capacity, complete dual bus electrical system, all-glass cockpit, some type of airframe ice protection, and a cruise speed of 180 or more knots. I expect the price to be very close to the high-performance four-seaters currently available. And I think Cessna will make its announcement later this year, by Oshkosh or sooner. What do you think the new Cessna single will look like?

Clear Doesn't Rime

I was busting through the tops of some broken clouds flying over Pennsylvania shortly after the New Year when I noticed splotches of ice forming on my Baron while I flew through the cloud. I was at 7,000 feet, ATC's favorite altitude for an eastbound flight in that area. I knew that I would soon be ordered down to 5,000 feet, then 4,000 and eventually 3,000, while still some 50 miles from my home at West-

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Left Seat

chester County Airport in New York so I was in no hurry to descend even earlier.

The engine air induction scoops on top of the nacelles of a Baron make a good ice gauge. They are good collectors of ice, and because they protrude, you can estimate the thickness, which is hard to do when looking at a wing or tail leading edge. The ice was intermittent and had built up to only 1/4 or 3/8 of an inch, not quite enough to cycle the boots, according to the Beech instructions. The ceiling was around 3,000 feet. I knew there was ice-free air below so I wasn't worried.

But, the tops of the clouds climbed and I was now almost continuously in cloud and I knew I had to do something. The Harrisburg controllers were prompt with a descent clearance to 5,000 feet, and by 5,500 feet I was between layers, the ice stopped accumulating, and the air temperature went up a couple of degrees to be very close to the freezing level. All of a sudden there was a tremendous crashing sound, and after a half-second of being startled, I knew what it was. A chunk of ice had broken off a propeller, or spinner, and slammed into the nose of my Baron. Then there was another crash and I knew the other side of the nose had gotten hammered.

Just about every pilot who flies multi-engine propeller airplanes has heard ice fly off the props and hit the nose. Even in singles, ice breaking off can pound the windshield and give you a start. But this was louder than usual, and I knew some paint or worse was gone. Turns out the right side of the nose lost about a softball size chunk of paint with a slight dent, while the left side had about half as much missing paint.

After landing and in the hangar when I was breaking ice off the underside of the cowlings—a place I hadn't seen ice collect before—it dawned on me that I had been collecting almost totally clear ice, not the usual rime, or mixture of rime and clear. Though the ice had not built to a troubling thickness, it was much more dense than the rime ice we usually find in clouds. This is the kind of ice that would last longer than your drink before melting. And when it came flying off the props or spinners, its density gave it the energy to do the damage that the same thickness of rime never could.

Next time I even think I'm collecting clear ice I won't dawdle to see what happens. A little rime is no big deal for a protected airplane, but clear ice, even a little, is a different problem. ✈

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Airways

INDUSTRY NEWS AND NOTES

Challenger 605 Completes Maiden Flight

FIRST FLIGHT



Bombardier's Challenger 605, initially announced at the National Business Aviation Association convention in November, 2005, made its first aerial foray on January 22, 2006, from the Montreal-Trudeau International Airport. For the three-hour, 23-minute flight the 605 took off at a gross weight of 38,734 pounds and step climbed to 41,000 feet. Designed to test basic system functionality and to assess the handling and flying qualities, the first flight included a test of handling qualities; flight control checks and avionics in an altitude block between 5,000 and 15,000 feet; a series of engine, pressurization and environmental control checks at 30,000 feet; and basic engine and handling characteristics at 41,000 feet. Bombardier is anticipating Transport Canada certification in the fourth quarter of this year with the 605's entry into service scheduled to occur during the third quarter of 2007.

S-TEC DEALS

Free Glass Cockpit With Autopilot Purchase

S-Tec is offering a sweet-sounding autopilot deal. Buy a new 2100 Digital Autopilot for your STC-eligible King Air 90, Conquest I or Cheyenne I or II and S-Tec will throw in a Meggitt flat-panel display system as part of the deal. Factory installation is included. The glass cockpit—the Meggitt Magic system like that on many existing Piper Meridians—includes a primary flight display (PFD), a navigation display (ND) and a solid-state air data attitude heading reference system (ADAHRS). The cost of the system (shown here in a 182 test bed) is \$119,800 installed at S-Tec. Understandably, the price doesn't include any extra equipment you might need for the installation. For more information, visit s-tec.com.



NEW JET

The newly unveiled Spectrum 33 proof-of-concept airplane made its first flight January 7, 2006, from Utah's Spanish Fork airport to nearby Provo Airport. First announced at the NBAA Convention in Orlando in November, 2005, the light jet was being flown, said the company, "with greatly reduced engine thrust." Indeed, the flight lasted just a few minutes, and though the company implied in its press release that the intention of the flight was to reposition the airplane to Provo, the company admitted that during the short flight "pitch control was not optimum."

On February 2, the control problems



Spectrum 33 Has Eventful First Flight

reportedly resolved, the Spectrum 33 made two successful flights lasting just under an hour. Certification of the \$3.65

million, Williams FJ33-4 powered, all-composite light jet is slated for late 2007 or 2008.

ELECTRONIC LOGBOOKS

Online Program Simplifies Recordkeeping

An online recordkeeping program at the AircraftLogs website provides users with a way to manage virtually all the records associated with owning and operating an airplane. The program includes aircraft maintenance records with automatic timers; pilot records with currency warnings, integrated tax and expense records; squawk management integrated with maintenance providers; document archival and storage; reporting tools; 24/7 access; capability for multiple aircraft and pilots; and security and backups. A subscription to AircraftLogs includes the "Pilot Control Panel" and the "Maintenance Control Panel," which allow pilots and maintenance people, once the owner has granted them access, to check flight readiness. Subscribers can load their own aircraft and flight information or AircraftLogs will do it for a fee. Monthly fees for a subscription run from \$10 for a basic pilot account to \$43.75 for a piston single, and up to \$63.75 for a multiengine turbine account. A 20 percent discount is offered for annual subscriptions and a 10 percent discount for six-month subscriptions. For more information, visit aircraftlogs.com or call 888/359-5647.

FREE UPGRADE

EXECUTIVE PROMOTIONS



Columbia Is Offering Terrain Awareness Retrofit

Now that Columbia Aircraft Manufacturing has made the E-Prox terrain awareness program standard on its 2006 Columbia 350s and 400s equipped with the Garmin G1000 or GNS 430, it has decided to update all 2005 and older Columbia aircraft equipped with the GNS 430 at no expense to owners. Columbia 350 and 400 owners can upgrade their 430s with a Columbia-supplied voucher that covers the labor cost of removal, the software upgrade and the re-installation of a single 430. The company is mailing coupons to all eligible owners. Owners who haven't received the coupon should contact Columbia Customer Care at 888/599-8660.

Cirrus Design Appoints New President

David Coleal has been promoted to president of Cirrus Design while maintaining his position as COO. Alan Klapmeier is CEO and Chairman of the Board, while his brother and Cirrus Design co-founder, Dale Klapmeier, has been promoted to the position of Vice Chairman of the Board. Coleal, before joining Cirrus in 2001 as executive vice president of manufacturing operations, focused on lean manufacturing and other manufacturing techniques while at Toyota, Caterpillar and McKinsey & Company.

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F22 Raptor Goes Operational

MILITARY AVIATION

It's official: The United States Air Force has certified the world's only "fifth generation" fighter jet as operationally ready. The Lockheed Martin F-22 combines supersonic speed (including supersonic cruise without afterburner) with stealth and advanced targeting, weaponry and defense capabilities to make it hands down the most advanced fighter jet on the planet. With plans to field 183 Raptors in all, the Air Force has already begun to fly operational missions with the jet, including homeland defense missions, so you might see one any day now.

It wasn't a short gestation period for the world's best air superiority fighter. The need for a jet like the F-22 to replace the F-15 was first officially voiced by the Air Force in the early 1980s. But the first flight of the prototype YF-22 didn't take place until 1990, while the first supersonic flight wouldn't occur for another seven years.

While much of its performance remains classified, according to some reports, in aerial combat tests against F-15s and other frontline U.S. fighters, the F-22 had a near perfect "kill record" and was never picked up by its foes' radar during mock combat flights.

Such capabilities come at a price, though: The cost of each F-22, by some estimates, is around \$125 million.

BIZJETS

Eclipse Expands

Earlier this year Eclipse Aviation broke ground on a new, 52,000-square foot primary assembly building for its Eclipse 500 very light jet, which is scheduled for FAA certification in June. The new structure is just one of three new buildings, bringing the total to six, which should be in place by June. Together they will allow Eclipse workers to ramp up production to four airplanes a day, so Eclipse can begin working off its swelling order book, which it says now stands at more than 2,360 jets.

PREHEAT SOLUTION

Engine Heater Takes the Chill Out of Winter



An electric heater that pushes out air at temperatures up to 190°F for preheating airplane engines is available from Sporty's. With 500, 1,000 and 1,500-watt settings and a thermostat, the AeroTherm Electric Engine Heater can remain plugged in all winter and maintain a pre-selected temperature. The heater, which eliminates the need for propane tanks, is said to warm an engine sufficiently for starting in an hour, or completely warm the engine in three hours with an outside temperature of 0°F. The unit comes complete with two hoses, a stand, carrying case, a nylon suspension band to hang it from the propeller and sponges to seal the air intakes. The AeroTherm Electric Engine Heater is priced at \$399. For more information call 800/SPORTYS (800/776-7897) or 513/735-9000; fax 513/735-9200; sportys.com.



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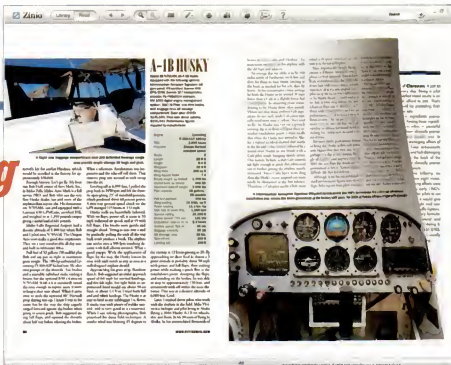
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System to Provide Rural Air Service

North Dakota has more than 70 paved runways but only eight of its airports offer commercial service. But that's about to change. Expanded Air Service Enterprise (EASE) is launching Point2Point Airways that will initially offer air service with a fleet of Cirrus SR-22 airplanes. In 2002 the Department of Transportation awarded the city of Bismarck a Small Community Air Service Development grant of \$1.5 million. Over several years some \$250,000 of the grant was spent to research an air service solution. The result of the research was Point2Point, which, when it matches the DOT's grant dollar for dollar, will be

able to use the funds to roll out and implement its rural air service. Two Cirrus airplanes are based in Bismarck and over a 24-month period, the contract calls for a total of 15 airplanes, including a fleet mix that will include multiengine aircraft as well as the Cirrus. Later this year, individuals and organizations will be able to pre-purchase time for on-demand flights on the Cirrus fleet in North Dakota and neighboring states. For members requiring more range, Point2Point will forge relationships with existing charter companies for supplemental turboprop or jet service. In the meantime, Point2Point is offering a shuttle service from Minneapolis International Airport to Duluth, Minnesota, for pilots heading to Duluth to pick up their own Cirrus airplanes from the factory. For more information, call 701/738-0470; flyp2p.com.



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WHOLE-AIRPLANE CHUTES

Another Cirrus Hits the Silk

All three people aboard a Cirrus SR22 piloted by a 12,000-hour ATP walked away unscathed after the pilot deployed the airplane's whole-airplane recovery parachute system. According to the NTSB's preliminary report, the pilot, who was unaware of an airmet for occasional moderate to mixed icing between 3,000 and 8,000 feet, asked for a climb from 7,000 to 9,000 feet after picking up icing in clouds. He told investigators that he lost control of the airplane in clear air

during that climb, and that the airplane subsequently entered a spin. After the pilot was unable to regain control, he activated the chute.

After a one-minute descent under the canopy, the airplane came to rest in trees just four feet from the ground and near a highway. The NTSB is continuing its investigation.

GROUND TRANSPORTATION

Motor Bike Folds to Fit Airplanes

One of the frustrations of flying is the lack of ground transportation at many of the smaller airports. Aircraft Spruce has a solution: the Windjammer Folding Bicycle. The motorized bike is capable of carrying 300 pounds and can hustle along at speeds up to 25 miles per hour on flat roads. The fuel tank for the 33-cc engine, which develops 1.8 horsepower, holds half a gallon of fuel with which the bike can cover some 100 miles. Without fuel the bike weighs only 44 pounds and folds to 31 inches by 32 inches by 15 inches, which will easily fit in most airplanes; full size the bike measures 63 inches by 42 inches by 13 inches. Price of the Windjammer, in either red or yellow, is \$895 from Aircraft Spruce & Specialty at 877/4-SPRUCE or AircraftSpruce.com.



Air Force One Celebrated at Reagan Library

Aviation aficionados who think the Flying White House would be a far more interesting site to tour than the earthbound version in Washington, D.C., should put the new wing of the Ronald Reagan Presidential Library in Simi Valley on their list. Last October, the library opened a new Air

Force One pavilion dedicated to the various versions of Air Force One and featuring the Boeing 707 that served as the Flying White House from 1972 until 1990. The aircraft is housed in a spectacular, three-story exhibit hall whose sloping floor falls away from the tail of the airplane to leave the 707's nose poised 50 feet in the air, looking out on a panoramic view of the valley beyond. The airplane is open for tours as well as external viewing.

To put the 707 in its proper context, the library also commissioned a 120-foot by 12-foot mural by renowned aviation artist Stan Stokes depicting the entire history and family of aircraft that have served as the Flying White House, from Franklin Roosevelt's "Dixie Clipper" to the present-day Boeing 747s. Stokes, whose work is known for its vivid, life-like detail, has painted murals of subjects ranging from the Tuskegee Airmen to the Battle of Britain and has had numerous murals and paintings commissioned by NASA, the Smithsonian, and air museums around the country.

Stokes' mural of the Flying White House includes 21 different aircraft. Among other interesting items, the col-

lection includes the Aero Commander that President Eisenhower used to shuttle back and forth between Washington and the short, grass strip on his Gettysburg farm, a United Airlines DC-10 on which President Nixon and his family bought first-class tickets for a one-time trip to California during the 1973 fuel crisis, and the first aircraft specifically built for a U.S. President—the silver "Sacred Cow" C-54, that flew President Roosevelt to the famous 1945 Yalta conference.

The Reagan Library's Air Force One pavilion also features a President Johnson-era Marine One Sikorsky VH-3 Sea King helicopter and a presidential motorcade featuring President Reagan's 1984 parade limousine, as well as other displays and memorabilia. There's even a functioning Irish pub located on the ground floor—"The Ronald Reagan," originally known as O'Farrell's, which the President and Mrs. Reagan visited in June 1984. The pub was subsequently brought to Simi Valley from its original home in Ballopteen, Ireland.

For more information on the Air Force One pavilion and mural, visit reaganlibrary.com or stanstokes.net. —Lane Wallace

MUSEUM OPENING

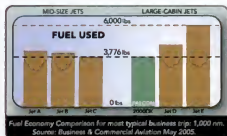


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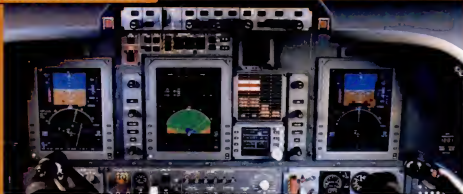
The TSO'd PCD7100-P fits in the standard avionics stack of your airplane. The vibration-resistant CD player, which

is tolerant of unusual attitudes, can keep on ticking even when the ride gets a bit rough. The unit plays regular store-bought CDs, but the beauty is that it can play MP3 CDs or MP3Pro CD/R and CD/RWs, which you can record at home. The latter enable up to 20 hours of uninterrupted music on a single disc, which is longer than the endurance of anything this side of the *GlobalFlyer*. The system

sends its output to many compatible audio panels (needless to say, to all of PS Engineering's own units). To find out more about the system, visit ps-engineering.com.

The PCD7100-P normally sells for \$849, but you might win one for free by entering our giveaway on flyingmag.com. Good luck!

AIRCRAFT DELIVERY



First Piaggio Avanti II Goes to Swiss Customer

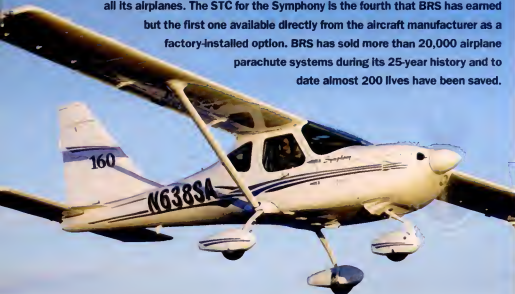
Piaggio Aero Industries has delivered the first of its Avanti II turboprops to a company based at the Lugano Agno Airport in

southeast Switzerland. The upgrade to the P180 Avanti features Rockwell Collins Pro Line 21 digital avionics with three 10-inch

by 8-inch LCDs, an FMS 3000 flight management system and the AHS 3000 attitude heading reference system. Up-rated Pratt & Whitney PT6-66B pusher engines, when introduced on the production line later this year, will provide higher cruise speeds. The Avanti II's performance, which includes a range of more than 1,700 nautical miles at a speed of 398 knots and a maximum cruising altitude of 41,000 feet, will allow it to comfortably operate from the 3,800-foot long Lugano runway at an elevation of 915 feet that requires a steep approach procedure. Piaggio has more than 100 orders for the Avanti II, including the order for 36 from fractional operator Avantair that was confirmed at the NBAA convention last November.

STC AWARDED

Ballistic Recovery Systems (BRS) has been granted an STC for the installation of its whole-airplane parachute recovery system for the Symphony SA 160. Cirrus Design has promoted the whole-airplane parachute and made it standard on all its airplanes. The STC for the Symphony is the fourth that BRS has earned but the first one available directly from the aircraft manufacturer as a factory-installed option. BRS has sold more than 20,000 airplane parachute systems during its 25-year history and to date almost 200 lives have been saved.



AIR-TAXI EXPANSION

Linear Air Places Deposits on 30 Eclipse VJs

With the acquisition of an additional \$2.5 million, Linear Air, an air-taxi provider based in Lexington, Massachusetts, has funded initial deposits on 30 Eclipse 500 VJs. The Eclipses will join Linear's fleet of Cessna Grand Caravans and allow the company to expand its service from its current bases (Teterboro Airport, New Jersey; Hanscom Field, Boston; Westchester County Airport, New York; and San Juan, Puerto Rico) to several other major metropolitan areas and to smaller markets within point-to-point 500-mile range.



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AVIONICS ADVANCES

Portable Collision Avoidance System Introduced

Zaon Flight Systems has released its PCAS XRX, a small, portable collision avoidance system that provides range, relative altitude and bearing of the three closest airplanes, although the unit tracks up to 10 airplanes at a time. The stand-alone XRX, which responds to Mode C transponder transmissions, is independent of ground-based radar. Traffic is announced by two levels of voice alerts heard through the headset and audible beeps. The range of the PCAS is scalable to a maximum range of six nautical miles and an altitude of plus or minus 2,500 feet. The unit's LCD display shows the targets' squawk codes, altitudes and bearings; according to Zaon, the range is accurate to .2 nautical miles and the altitude to plus or minus 200 feet. Internal sensors include a pressure altimeter, a solid-state compass, a solid-state attitude and bank sensor, and temperature compensators and overtemp protection. In addition, the device, powered by the aircraft's electrical system, monitors aircraft bus voltage and the host airplane's transponder operations. Traffic data can be output through an RS-232 to integrate with other displays. List price of the PCAS XRX is \$1,795. For more information log on to zaonflight.com.

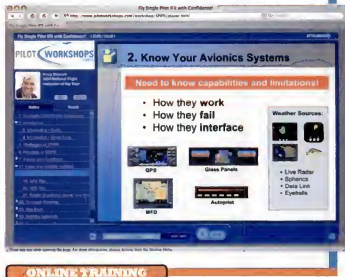


DOCUMENTARY FILM

The Van Nuys Airport in southern California is the subject and star of the documentary film, *One Six Right: The Romance of Flying*, by Brian J. Terwilliger. The DVD, narrated by pilots, air traffic controllers, historians and flying aficionados such as the movie director—and pilot—Sydney Pollack and the actor Lorenzo Lamas, traces the history (Amelia Earhart broke a speed record at Van Nuys and Marilyn Monroe was discovered working in a hangar there) and the struggles of the airport. The high-definition DVD, priced at \$28.95, includes enhanced aerial flying sequences, photo galleries, time-lapse cloud photography and additional footage. For more information, call 800/SPORTYS (800/776-7897) or 513/735-9000; fax 513/735-9200; sportys.com.

Website Hosts Pilot Workshops and Seminars

An online series of seminars is being introduced on pilotworkshops.com. Founded by Mark Robidoux, who acts as emcee, the workshops are presented by aviation experts and use slides and audio to present the subject. Two of the early seminars, "Hazardous Attitudes" and "Single Pilot IFR," are conducted by Doug Stewart, FAA's 2004 Flight Instructor of the Year. A third, "Safely Operating at Non-Towered Airports," is presented by Bob Martens, an FAA Safety Program Manager and retired USAF colonel. There are three levels of packages for each workshop that range in price from about \$25 to \$100. The \$25-Silver level allows customers to download the workshop and corresponding workbook; \$45-Gold adds a downloadable word-for-word transcript (.pdf) and mp3 audio option; and \$97-Platinum ships the entire workshop (binder, printed workbook and transcript, CD-ROM and audio CD) to the subscriber. Free sample seminars are available at pilotworkshops.com. I found the seminars I "attended" well done and more interesting than I anticipated. It's worth a try. —Tom Benenson



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It took Jim Gorman

Jim Gorman

Executive Creative Director

Campbell-Ewald Advertising

Active Pilot / FLYING Reader

It's an old story. It might even be your story. Boy falls in love with airplanes before he can ride a bike. Boy grows up deciding whether to be the next Chuck Yeager or Sky King. Yeager has speed. But Sky King has his own airplane. Meanwhile, life and reality intervene. Suddenly, it's four decades later and the boy has still never been in a cockpit.

He never stopped dreaming.

In all those years of craning his neck every time he heard an airplane, Jim Gorman never gave up the dream of flying. By the time he took his first lesson, he was 42 and on his way to becoming Executive Creative Director of one of the country's largest advertising agencies. He was staring

out his office window at a passing airplane when he was struck by an unintended irony. "I had just written an ad for a sports car which said Some Day You'll Run Out Of Some Days. And I realized that I'd just written the story of my life." A week later, he was sitting in a rented Cessna. Instantly, flying changed him from a driven executive with the all-consuming responsibilities of a family and high-pressure career into a kid again, with a dream that had finally come true.

Getting there is all the fun.

Soon after his checkride, Jim began shopping for an airplane. The first of many, he presumed. He bought a 1976 Beechcraft Sundowner. Nothing fancy. Surely he'd trade up to a Bonanza, then a Baron. But something unexpected happened. He fell in love with the little Beech. To Jim, the Sundowner's decidedly subsonic

cruising speed just meant more time in the air. And more time to fly with his wife, Marilyn, who found the wide, comfortable cabin a pleasant way to travel on weekends and vacations.

So, Jim made a rather unorthodox decision: to invest in making his modest little aircraft something he'd want to fly forever. He's spent the past ten years refurbishing it from nose to tail. "For what I've spent on avionics, instruments, paint, interior, engine overhaul and so on, I could have bought an old Bonanza. But, then I'd have an old airplane—with none of the improvements that I've made. I probably own the world's most over-equipped Sundowner." He grins. "But I love every minute I spend in it. And isn't that the idea?"

Every summer, Jim goes to Oshkosh with a shopping list. First, he installed an autopilot, then an electronic engine analyzer. Last year, it was

40 years to pass his checkride.



a Garmin GNS 530. "This year, I may add data-link weather. Yeah, I know. 'In a Sundowner?'" But if you fly cross-country around the Great Lakes, thunderstorms are part of the deal. And I figure that my life is as important as some guy in a Baron." Which also explains his belief in ongoing training and why he has earned IFR, Commercial, Glider and Seaplane ratings.

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"I read FLYING for years before I took my first lesson... kind of like the way I read Playboy for years before I actually had sex. That's not a bad analogy, either. I got my first subscription to FLYING when I was twelve. I'd fantasize about the planes in the photos. Still do. But I really do read FLYING for the articles. Honest, Mom. There's always something I can use... it's invaluable."

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WRITE NO. 181 ON READER SERVICE CARD

On Top

By Richard L. Collins



Cessna 195 Down ...

I have lost about one friend, acquaintance or business contact per year in general aviation airplanes since I started flying in 1951. There were also a few in military flying and one on a Central American airline. I always tried to learn from those events and somehow felt that because

it was such a span of time and exposure that my experience was representative of the big picture even though I knew from research that it was not.

Up to December 18, 2005, not one of those fatal accidents that took a friend or acquaintance involved the failure of the engine on a single. All that changed in an event that has deep roots.

First, some background. About 50 years ago I taught an Army friend, Earl Tillman, how to fly. I loaned him my 1948 Packard for courting and when Earl and Carolyn were married I served as best man in their wedding.

They had two children, Gary and Tamara. We weren't in close touch for a while but in recent years had gotten

close again. No friends like old friends, or something like that. Earl had continued his flying, owned a number of airplanes, and now has a Skylane RG.

Gary Tillman shared his dad's enthusiasm for flying and became active in the Civil Air Patrol as well as operating an insurance brokerage agency based in Rome, Georgia, that specializes in aviation. I have bought my airplane insurance from the agency for a long while. Because of his CAP and insurance activity, Gary was well acquainted with risk and he and I had many long conversations on the subject, including the question of singles versus twins.

Gary and our son, Rich, became close friends and flew and did other things to-

gether on a frequent basis. At one point, Gary had a Piper Colt that had been converted to a taildragger. He and Rich flew that from Rome to Hilton Head, South Carolina, to come to a gathering. That was some high-performance cross-country trip. I was glad I had given Rich a Garmin handheld GPS.

Gary and his wife Denise had three daughters and family flying was a big thing for them. Gary liked to deal in airplanes and, with few exceptions, that Colt being one, the airplanes that he bought would accommodate his whole family. There were a couple of Barons, one pressurized, a couple of Twin Commanders, an Aztec, and a Beech 18. He called in November and we had a con-



● Gary liked classic airplanes and a couple of years ago bought a Cessna 195 like this one.

On Top

version about him buying a Cessna P210.

Gary liked classic airplanes and a couple of years ago he bought a Cessna 195, which leads us to December 18, 2005. Gary and his 16-year-old daughter Hannah and two of her friends, Anna Kipp and Rachel Hostetler, set off in the 195 on an air adventure to the Bahamas.

The first leg was from Rome to Craig Field near Jacksonville. That flight was uneventful and, at about 300 miles, a rel-

atively short leg. Perhaps three teenage girls in a light airplane calls for short hops. The next planned stop after Craig was Fort Pierce, Florida, not that far away. The weather was not good, with an overcast at about 500 feet and visibility varying from three to five miles. The tops were said to be at 6,000 feet. Gary filed IFR for 7,000.

What follows is just what I have learned about the event. The NTSB will be a while issuing a final report. For some rea-

son, the FAA was slow releasing the ATC transcript. As the airplane climbed through 5,000 feet, over land, with everything apparently normal to that point, the situation turned ugly. Gary called and told the controller of a power problem. Earl told me that the controller then offered vectors for an ILS approach to nearby St. Augustine. The ILS there is to Runway 31 and is, except for the last couple of miles or so, over the Atlantic Ocean. There was a strong north-northwest wind, and the ceiling at St. Augustine was 500 feet, and the visibility three miles.

Another pilot listening on the frequency reported discussion about the engine and about maintaining altitude and then after some other headings the controller had Gary turn to a westerly heading and reportedly told him that if he couldn't maintain altitude, St. Augustine was three miles off his nose. Then the controller reported that radar contact was lost, asked how many were on board, and said they were sending help. The airplane went into the Atlantic 1.3 miles from shore.

Even though the seas were running high in the strong northerly wind, the ditching was apparently not violent to a great extreme. The two back seat passengers got out and were rescued after over an hour in the water, though one was pronounced dead at a local hospital. The other, Rachel Hostetler, was home in a couple of days. Gary and Hannah were found two weeks and a day after an extensive search effort. The Rome newspaper had medical speculation that they had been rendered unconscious by the impact and then drowned. The 195 was built before shoulder harnesses became an item in airplanes.

Lessons. One, engines do quit and you can get hurt when they do.

Two, an engine failure while IFR raises a lot of questions. The time will be short, depending on altitude, and the options are limited, again depending on altitude and ceiling and visibility. In this case, the strong northerly wind meant the gliding range inbound on the ILS would be limited. Monday morning quarterbacking would suggest that it would have been better to stay over land and make the most of whatever showed up when below the 500-foot ceiling. However, if the power loss was complete, which it apparently was, only about five minutes were available for critical decisions.

There are a lot of places where instrument approaches or routings send single-engine airplanes out over water, but this

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WRITE NO. 340 ON READER SERVICE CARD

On Top

can and should be avoided whenever possible. In this tragic accident, it is reasonable to question sending or flying a powerless airplane out over water.

Because of my long friendship with the Tillman family, will I think differently about single-engine airplanes because of this event? I don't think so. The sadness this brings to me is great but accidents are accidents.

The risks found in flying light airplanes are demonstrated day in and day out and they will never go away. I am writing this on January 6. I have not flown since December 17. My next flight will be in my airplane, a test hop after an engine overhaul that took forever. Will I fly it as if the engine could quit at any point in the flight? You bet. As always. I don't think that we should be paranoid about this, just realistic. If the engine on a single fails, we have a short period of time in which to minimize the results of this. Giving it thought on a continual basis is the best way to be ready to deal with it.

X-Plane

While my engine was undergoing that overhaul that took longer than it took to build the airplane, I had a previously



■ X-Plane 8.32 includes amazingly detailed World-Wide Global scenery on seven DVD's.

mentioned new rental Skylane to fly. I had something else, too. X-Plane is aeronautical computer software that offers a tremendous amount of capability (look all that up at x-plane.com). I got a copy of that and a joystick from Amazon and have been having a ball with it.

Like most people who spend long periods of time pecking away at a computer, I like diversions. I have been taking a solitaire or hearts break when the writing becomes tedious. Now, though, I take my

Boeing 747-400 flying on X-Plane. It offers a choice of airplanes to fly, but I like that one the best.

Both the panel, the head-up display with a flight path indicator, and outside depictions on X-Plane are excellent. I really can almost lose myself in a flight.

I'm not going to blow smoke and tell you it's just like the airplane because it isn't. But all the principles are the same. I'll take you along on the flights I like best for a break from work.

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WRITE NO. 344 ON READER SERVICE CARD

On Top

Takeoff can be from any airport, as can landing. Your choice. They are all in there. One I have been using is Chicago Midway, for a reason you will learn shortly. It comes up on Runway 22L for departure. Flaps down two clicks or it'll go off the end of the runway while still rolling. Brakes released, power 100 percent, steering is by rotating the joystick, or, you can do stick left and right. It tracks well without much steering input.

Rotation is at 135 knots, then gear up. Wait until the rumble of the main gear on the runway stops, though. Going through 200 knots the flaps come up, then power back to 80 percent to keep from going through the 250-knot speed limit and to prepare for a level-off at 3,000 feet.

In a real jet, it takes a furious amount of nose-down trim as the airplane accelerates. In this it just takes moderate forward pressure on the stick, but you soon run out of pitch control authority as it accelerates and that's when you know it's time for trim, which is on the stick.

Level at 3,000, I fly a heading of 090. Soon the shoreline of Lake Michigan comes into view. KCGX (Meigs Field) is in the visual display and shows on the multifunction display of the copy of X-Plane that I have. When flying a heading of 090, KCGX is just shy of 90 off the left wing; I start a turn to 360 to go for its Runway 36. There's a VASI on this runway and soon it is red and white and time to get the gear and the flaps down. There is a humongous trim change as well as some ballooning when the flaps go slowly out and down. That has to be anticipated and the trim tended lest the VASI picture go bad. The flight path indicator on the head-up is a help here because it simply shows you where the airplane is going and if it is on the end of the runway, and the VASI is red and white, things are going well.

About 155 knots is as slow as it'll tolerate on final without the stall warning going off. There are audible warnings for sink rate as well as altitude callouts. The landing is a little different but with practice it's doable without a bounce. Then with reverse, braking, and the spoilers up I can stop it on the 3,899-foot long runway at Meigs about half the time. The other half I press "p" for pause and that stops it before the end of the runway is passed.

Then back into position for takeoff at Meigs. Before brake release I face left, and

give Mayor Daley the bird. Both hands. Then off we go. It uses most of the runway reaching 135 knots and a little turn to the right after takeoff ensures clearance from the tall buildings.

Next, using the MFD, I vector myself for an ILS to Runway 31C at Midway. The device will allow you to position the airplane on final for any approach but to me that defeats the purpose. I am flying, and when you are flying you have to fly all the way.

Flying the ILS is challenging, but once you get the power settings and trim changes with flaps scoped out, it gets a lot easier. There is a flight director but I haven't gotten used to that yet and most often fly raw data. There's also an autopilot that flies it well. Incidentally, for the ILS to work you have to have the proper frequency set in the nav receiver.

Then I click over to La Guardia where it is nighttime. Take off on Runway 22, go over to Kennedy for a visual approach and landing on 22L, then to White Plains for a visual approach and landing on 34 then back to La Guardia for an ILS to Runway 4. The night visual is great for the airport environment and when you head out over water there's a little spatial disorientation, if that is possible while sitting in a desk chair in my office.

After those three night landings I declared myself current (on computer night landings) and went back to writing this.

The operation manual that comes with X-Plane is not that thorough, mainly because it would be the size of the Manhattan phonebook were it to cover everything. Some things you just have to figure out, but if you are familiar with the type airplane being flown that's not hard to do. The software also does some quirky things from time to time but they are a minor distraction.

Will flying this do your real flying any good? I think so. The X-Plane visual is really good, especially in relation to the runway environment, and flying with a head-up display with a flight path indicator is quite educational.

My Chicago and New York area flights are a tiny fraction of what X-Plane will do. But they are a nice diversion and a lot more fun than solitaire or hearts. As I said, Amazon has it. And in full disclosure I must add that X-Plane is the brainchild of Austin Meyer who is my late stepmother's great nephew.





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Light Sport Thoughts

I WAS VERY DISAPPOINTED IN RICHARD COLLINS. In his acerbic and wandering dismissal of light sport aircraft (*On Top*, February), he expresses *Flying* magazine's prejudice against light, slow, and simple aircraft and implies that because airplanes used to be slow and simple and accident rates were high, there must be some kind of causality there and pilots of light sport aircraft will not be taught how to recover from a stall. I'm a little lost here, but it gets worse—Mr. Collins then moves from talking about “an aeronautical slaughter of epic proportions” (his words—potential insurance underwriters take note) caused by inadequate training requirements—to an engine failure in a P210 because of the pilot ignoring a high metal content in his oil. I think Mr. Collins' article does a terrific disservice to instructors, and needlessly casts a pall on a new program designed to get more people flying safely. I have been an instructor for more than 20 years and have never signed a student off for a practical flight test with the 40 hour minimum number of hours, nor will I probably ever send a student for his Sport Pilot rating with only 20. I currently fly sailplanes as well as a Citabria 7KCAB and a 1941 Taylorcraft. I have no interest in the latest on multi-million dollar bizjets and war-stories from FL 390, nor, I suspect, do a lot of your readers. Mr. Collins needs to come down a little lower—general aviation needs encouragement and helpful criticism from its experienced writer-pilots, not unsupported disparagement from one of its more prominent representatives.

ERIC M. HANSON
Warren, Vermont

Richard Collins' “Light Sport Thoughts” article was good. So today's 172s (and/or the pilots that fly them) are 10 times safer than lightweights of 50 years ago, but how much safer are they than the Cubs and Aeronacs that are flown today? And it seems that the operative question is: Will this “aeronautical slaughter of epic proportions” be entirely or mostly the result

of limited or poor training, or is there an appreciable problem that results simply from the light weight of the airplanes?

STEVE MINK
Walnut Creek, California

I can see that I've finally met someone who has the same issue with the concept of LSA as I do. I'm okay with the reduced limitations and flight restrictions on the LSA holder as a concept. What I'm very curious about, though, is the issue of the 20-hour training limit. Heck, it takes many people 15-20 hours just to get a grip on landing an airplane. I surely think the people who pushed for the 20-hour limit are fooling themselves that a pilot should feel ready to go at that point, even with the increased restrictions. Should we maybe invent a “Light Instrument” rating for people who don't plan to fly approaches, but only enroute IMC? How about an asphalt-only clause, so that a pilot can have less training time as long as they don't intend to try to squeeze into a 1,500-foot field? Forty hours isn't really all that long. I think it was two months for me. The last thing the industry needs is something more to give aviation a black eye and bring down even tighter regulations.

TIM OLSON
Elk Mound, Wisconsin

First Solo Memories

Reading Lane Wallace's “Exciting First Solo Flight,” February, brought back memories of my first solo flight on December 24, 1943. I had 12 hours of dual time in a Fairchild PT-19 U.S. Army Air Corp Primary Trainer—the plane was Cimarron Field, Oklahoma City, Oklahoma. It had snowed the previous evening, and the auxiliary field where the solo flights took place was one large white expanse of Oklahoma flat-

land—no buildings—no trees—no fences—nothing—just white. I took off and made the usual landing pattern but could not find the field—all I saw was white. I climbed 1,000 feet to look for other airplanes and finally spotted one. He was in the landing traffic pattern, so I quickly lost my altitude and followed him down. My instructor was waiting for me—he understood the problem I just experienced—he just said, “Good Landing.”

BOB WIEMAN
St. Paul, Minnesota

Read with great empathy about Lane Wallace's sentimental memories of and since her first solo 20 years ago. Since a main interest for our Flight School is student pilots, I couldn't help, though, but cringe about the description of the solo. Being brutally honest, it sounded like Lane's instruction up to that point was a classic case of rote level work, which as she experienced, doesn't usually allow for even a simple deviation like following another aircraft to the runway. Describing the first solo as a “terrifying” experience fur-



ther doesn't speak well for the training. What impact would that have on someone contemplating flight training or their first solo. For obvious reasons, a lot of people work hard to assure

that the first solo is perceived as a safe experience and that training allows for unexpected events. I wish this part of the article had put it that way.

WARREN WEBB
Cromwell, Connecticut

Where's the Correction?

In Mr. McClellan's article (*Left Seat*, February), he wrote "Average prices have not returned all the way to pre-hurricane lev-

els, but they are way off the peak." Our prices peaked out at \$3.65 (within one week) and have remained at \$3.65 to this day. There was no "correction." There is a lot of complaining, but no one is listening.

JANET CROSBY
Moriarty, New Mexico

Yours is the only letter we received on the topic which continues to be very strange, because fuel prices have been the number one

topic of pilot complaints for many years, but now there is apparently a grudging acceptance—Ed.

A Ded Head

I'm writing to congratulate Tom for his use of the word 'ded' followed by the full word (deduced) in his article "Sophie's Choice" (*Airwork*) in February. I wish I had a nickel for each time I have seen writers in all sorts of aviation magazines spell it out as 'dead reckoning,' obviously not knowing that it was wrong! I think I can even recall one occasion when that giant of correct English usage, Peter Garrison, wrote 'dead reckoning!'

LOU WISE
Toronto, Ontario Canada

We let Tom have his way on this one because it is his column, after all, but dead reckoning is in our Webster's, while dead reckoning is not. The 'ded' club has at least two members, you and Tom—Ed.

How Long to Learn?

Taking 70 hours and spending \$12,000 for a Private Certificate is outrageous. Your answer to Mr. Alford's letter (*Flying Mail*, February) about how much harder it is today is even more outrageous. I received my certificate in February of 2003 and had 45.6 hours the morning of my check ride. All of my friends received their certificates in under 50 hours. If you are truly serious about flying you will be successful. The biggest issue is finding a school and instructor who want to really teach and not "milk" you for every dollar or hour they can get.

KEITH LANNING
Woodstock, Georgia

Referencing the hours required and cost of a private license, if anyone spends \$12,000 and 60-plus hours for a private license, they are training at the wrong place. My son who lives in Oklahoma is prepared to take his check ride with 44-hours and \$6,000 spent.

JOE WILKINSON
Shreveport, Louisiana

Congratulations on your accomplishments in flight training, but believe it or not, the national average of hours logged prior to earning a Private Certificate are much higher than your experience—Ed.

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Edited by Lori Singer

Calendar

April Activities Abound

Aviation Program Breakfast. T-6 Racing Reno Style, April 1. Gwinnett County Briscoe Field, Lawrenceville, GA. Call 770/394-5466; eaa690.org.
U.S. Air Power Over Vietnam. Seminar and flight demo of a Vietnam War-era warbird, April 1. The Air Museum "Planes of Fame," Chino Airport, Chino, CA. Call 909/597-3722; planesoffame.org.

Weekend Ground School. For the Private Pilot, April 1-2. Stevens Point Municipal Airport, Stevens Point, WI. Call 715/252-3326; amhighaviation.com.

Sun 'n Fun. EAA 32nd Annual Sun 'n Fun Fly-In, April 4-10. Lakeland Linder Regional Airport, Lakeland, FL. Call 863/644-2431; sun-n-fun.org.

Mountain Wave Soaring Camp. Marfa Gliders, April 8-15. Marfa Municipal Airport, Marfa, TX. Call 800/667-9464; flygliders.com.

HAC. Helicopter Association of Canada's 10th Annual Convention & Trade Show, April 9-11. Hilton Quebec Hotel and the Quebec City Convention Center, Quebec City, QC, Canada. Call 613/231-1110; h-a-c.ca.

AEA. Aircraft Electronics Association show, April 19-22. Palm Springs Con-

vention Center, Palm Springs, CA. Call 816/373-6565; aea.net.

Aero Friedrichshafen. International Trade Fair for General Aviation, April 21-24. Friedrichshafen, Germany. Call +49 (0) 75 41/7 08-3 59; aerofriedrichshafen.com.

New England Aviation Expo. April 22. Daniel Webster College, Nashua, NH. Call 603/879-6807; faa.gov/region/ane/expo.

Tuskegee Airmen. April 22. Palm Springs Air Museum, Palm Springs, CA. Call 760/778-6262; palmspringsairmuseum.org.

AAAE. 78th Annual Conference & Exposition, April 23-26. Manchester Grand Hyatt, San Diego, CA. Call 703/824-0504; aaae.org.

Spring Fly-In. EAA Chapter 960's 3rd Annual, April 29. Flanagan Field, Farmville, NC. Call 252/758-1538; eaa960.org.

Spirit of Flight. Lone Star Flight Museum Airshow, April 29-30. Scholes Int'l Airport, Galveston, TX. Call 409/740-7722; lsfm.org.

Upcoming Events

EBACE. European Business Aviation Convention Expo, May 3-5. Palexpo

Convention Center, Geneva, Switzerland. Call 202/783-9364; ebace.aero.

Farnborough International Airshow. July 17-23. Farnborough Aerodrome, Farnborough, Hampshire, England. Call +44 (0) 20 7227 1043; farnborough.com.

Oshkosh AirVenture 2006. 54th Annual Fly-In, July 24-30. Wittman Airfield, Oshkosh, WI. Call 920/426-6523; eaa.org.

LABACE. Latin American Business Aviation Conference & Expo, August 10-12. TransAmerica Exposition Center, Sao Paulo, Brazil. Call 202/783-9000; labace.aero

Reno Air Races. 43rd National Championship Air Races & Airshow, September 13-17. Reno Stead Airport, Reno, NV. Call 775/972-6663; airrace.org.

NBAA. National Business Aviation Association, October 17-19. Orange County Convention Center, Orlando, FL. Call 202/783-9000; nbaa.org.

AOPA. Aircraft Owners & Pilots Association Expo, November 9-11. Palm Springs Convention Center, Palm Springs, CA. Call 888/462-3976; aopa.org.



■ Trojan T-28 will be discussed in the U.S. Air Power Over Vietnam seminar at The Air Museum "Planes of Fame"

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Sport Pilot

How Many Hours?

Each month, *Flying* answers questions about the new Sport Pilot/Light-Sport Aircraft rule with assistance from the Experimental Aircraft Association (EAA), the authorities on the opportunities available within the category commonly known as "Sport Pilot":

I've never learned to fly, but I want to. The new Sport Pilot certificate is very appealing, but some friends of mine who are already pilots doubt that 20 hours of instruction is enough to be safe. What should I do?

When FAA and DOT developed the Sport Pilot/Light-Sport Aircraft Rule, it was designed with safety as the primary focus. Sport pilot flying skills are the same as those learned by private pilots during their first 20 hours of instruction—a time when the vast majority of student pilots earn the privilege to fly solo. Many of the remaining 20 hours required before one can take a private pilot check ride are spent flying as a solo pilot, or working on skills that are not part of sport pilot flying, such as flying at night or into congested

airspace. Your friends should understand that a sport pilot certificate is not a private pilot certificate. It is designed as a basic pilot certificate for safe, recreational flying, with different restrictions.

Your friends are also forgetting the vital role of the flight instructor and check ride examiner in sport pilot training. Instructors are not going to release students to take check rides if they are not prepared, and check ride examiners are not going to pass students if they cannot show adequate flying skills. Just as few private pilot students take their check rides at the minimum requirement of 40 hours (closer to 50-55 on the average), sport pilot students will often have more training than the minimum of 20 hours prior to their check rides.

Finally, proficiency and experience are essential for any pilot, regardless of rating. Private pilots who fly only a handful of hours each year will be hard-pressed to match the skills and flight awareness of a sport pilot who flies regularly.

I am flying with a special Issuance of my third class medical under Title 14

of the CFRs, Section 67.401. I desire to transition to Sport Pilot status. What is required of me to do this?

Your transition is simple—allow your FAA medical certificate to expire, at which time you automatically switch to sport pilot operations using your valid U.S. state drivers license in lieu of the medical certificate. Remember that you need to restrict yourself to exercising only sport pilot privileges and limitations while using your driver's license in lieu of a medical certificate, and you are allowed to fly only aircraft that fit within the definition of a light-sport aircraft (LSA). You also need to continue to keep your flight review current.

For more information on sport pilot, go to EAA's sport pilot website at sportpilot.org. EAA, which also hosts the annual EAA AirVenture fly-in at Oshkosh, provides in-depth information on the website, as well as a sport pilot hotline and complete membership services for all aviation enthusiasts. Call 800/564-6322 for membership information. ✈





Mark Ottosen
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*A complete set of rules is posted on the Gulfstream website at www.gulfstreamacademy.com

By Jay Hopkins

Training

Glass Traps

LAST MONTH I WROTE ABOUT MY EXPERIENCE in learning how to operate the Garmin G1000 glass cockpit. I found that if someone dedicates enough time and approaches the project in a logical manner, it really is not that difficult to get to the point that you can smoothly and effectively operate the system, even in a complicated IFR environment. There are a few stumbling blocks, however. While the overall operation of the G1000 is fairly logical, there are some deviations from the way things usually operate that can be very confusing until you realize what is going on, and there are some differences flying with a digital glass cockpit that can cause problems even in basic flying skills for someone with years of experience with round dials.

Like most GPS units, there are numerous menu pages that are used to perform flight plan functions or change what is displayed. In my previous article I described how the multifunction display (MFD) is operated using a flight management system (FMS) knob to access various groups of pages. The MFD also has flight plan (FPL) and procedure (PROC) hard keys. It

was only on my fifth flight with the system that I realized the FPL key actually accesses a group of three pages, just like the FMS knob, and the FMS knob must then be used to select the desired page. There is also a menu key (MENU) that must be pressed to call up different menus at various times. It seems to be used mostly with the FPL key, but it is also used with other pages and it takes a while to figure out all the times it must be used.

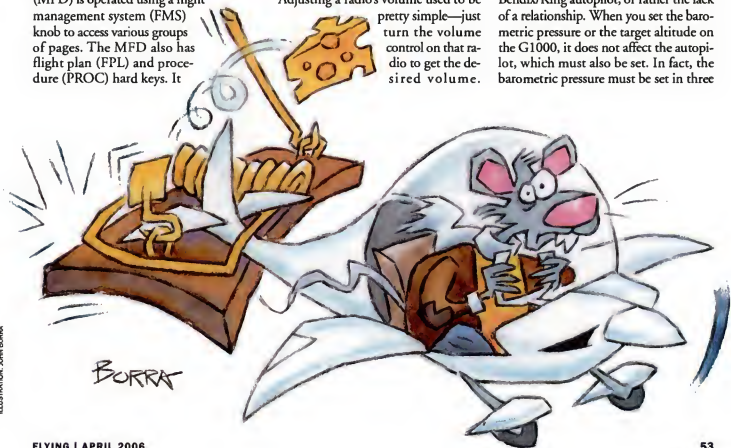
The lack of any annunciator lights takes some getting used to. When the checklist says to "Verify LOW VOLTS Annunciator (or any other annunciator) Off," there is nothing there to look at such as a light that is not on, just empty space on the PFD. Another problem is that the FMS knob and the intercom volume/squelch knob on the audio panel are identical and located right next to each other. I sometimes found myself turning the wrong knob and noticed other pilots doing the same thing.

Adjusting a radio's volume used to be pretty simple—just turn the volume control on that radio to get the desired volume.

With the G1000 there is only one volume control for both comm radios, and another for both nav radios. If you have selected a radio you are not using to change the frequency on that radio, you have also tied the volume control to that radio. The first time I tried to adjust the volume nothing happened because the volume control happened to be tied to the other radio at that point. I have learned that if I change a frequency, I should always make sure I reselect the active radio when I am done so if I turn the volume control I affect the radio I am listening to.

Another thing that takes getting used to is that the inside frequency is the active frequency. This means that for the nav radios, which are displayed on the left side of the PFD, the frequency on the left is the standby frequency and the one on the right is the active one. This is the reverse of every radio I have ever operated.

The most critical trap involves the relationship between the G1000 and the Bendix/King autopilot, or rather the lack of a relationship. When you set the barometric pressure or the target altitude on the G1000, it does not affect the autopilot, which must also be set. In fact, the barometric pressure must be set in three



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Training

places: the PFD, the autopilot and the standby altimeter. Approaching an ILS, when the G1000 automatically changes from GPS to ILS navigation, the autopilot drops out of navigation mode and reverts to basic roll control, along with whatever pitch mode is selected. There is no chime or other warning other than a flashing annunciator on the autopilot, which is located at the bottom of the panel where it is easy to miss.

A similar thing happens if the pilot manually changes the navigation source, and is worth six half-page bold-print warnings in the Pilot's Operating Handbook (POH). This is a dangerous trap for an overworked pilot who is barely keeping up with the system and assumes the G1000 is automatically flying the approach, just like it does on a GPS approach. A simple press of the approach button on the autopilot gets it back to flying the approach again, but the pilot has to remember to press that button at the appropriate time.

Despite all the emphasis on running the system, the most important thing is to fly the airplane, and probably the biggest challenge is using the digital vertical tapes. After 40 years of flying with round dials and needles, I found I have developed an innate sense of needle movement and what it means. I can watch an airspeed or altimeter needle out of the corner of my eye and quickly catch any deviations or trends. I had to work a lot harder to maintain my airspeed and altitude using the vertical tapes on the electronic display.

I found it particularly difficult to maintain altitude, especially in a steep turn. I finally realized this is because of the confusing and contradictory way in which the information is presented. Let's say I start to climb above my desired altitude. The Numerical Altitude Readout would start going up, the Altitude Reference Bug would go down, the Altitude Trend Vector would go up, and the Vertical Speed Pointer would go up, with the numbers in the pointer also going up. That is a lot of conflicting information replacing two simple needles that moved one way or the other. I think it is best to decide whether to use the Altitude Reference Bug or the Current Altitude readout and then just focus on that one input.

There is one problem with advanced glass cockpits like the G1000 that will mostly affect "mature" pilots. Like many

people, as I reached 40 my near vision rapidly deteriorated, meaning that I now need to wear reading glasses at night and have an adhesive magnifier attached to the bottom of my sunglasses for use during the day. It really is not much of a problem with a traditional instrument panel, because I can still easily read the round dials and needles, and only need the magnification for reading charts and other small print.

As I started using the G1000 I realized it is *all* small print. The PFD and MFD are also located fairly high on the panel. The result is that I found it very awkward to read all the information on the screens using my reading glasses and sunglasses, which are set up to read a chart in my lap. I am going to have to experiment with other types of glasses to see what works.

The bottom line is that the G1000, as installed in the C182T, is a great system that can significantly increase a pilot's situational awareness, but it does have some limitations. Because of the fancy glass cockpit look, it can appear to be a sophisticated flight management system, when in reality it is nothing more than an expanded Garmin 530 that includes the flight and engine instruments. There may be more to come in the future, but for now it is important to be aware of its limitations.

Much of its operation is simple to the point of being intuitive, while other aspects of its operation are confusing to the point of being difficult to learn and remember. If you plan on flying an aircraft with the G1000 or any other advanced technology system installed, you must take the time to learn how to operate the system to the level required for the type of flying you do, and you must operate the system frequently enough to stay current. If it has been a while since your last flight, you need to take the time to review critical operations before you take off, so they will again be second nature.

It is important to do any review or programming of the system either before you start to taxi or in the run-up area, not while you are taxiing. If you do start to get confused while in flight, particularly in a critical phase of flight such as an instrument approach, break off the approach immediately, get to a safe location and altitude, figure out what is going on, and then try again. Descending on final in bad weather is no time to start figuring out how this system works. 

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By Robert Goyer

School Update

CAE SimuFlite DFW—World-Class Flight Training

CAE/SIMUFLITE, A 22-YEAR-OLD TRAINING company with locations around the world, is without question one of the best training organizations in the world. But it's not just because it's big, which it is. Quite the opposite. SimuFlite's success has come in large part because early on it established itself as a company that did training differently. It had to, since it needed to compete against a much larger, more established company, FlightSafety, to win and keep training clients. As the new kid on the block, SimuFlite has never shied away from trying new and different approaches to training, many of which, while they seemed crazy at first, have become industry standards. The competition has been good for both firms, and for their customers, as well.

SimuFlite knew that in order to compete it would have to offer a personalized style of instruction, a boutique approach, if you will, that treats each customer like the only one in the place. This explains

why SimuFlite has become a destination of choice for owner/pilots looking to satisfy their recurrency requirements. To paraphrase one of their mottos, SimuFlite trains not just the pilots who fly the CEOs, but the CEOs who fly themselves.

This focus on individualization of instruction has led the company to develop alternative training products for customers whose time demands and needs are different from the typical corporate pilot. If your availability doesn't mesh with the preset schedule, it's likely they'll be able to make a different, more flexible plan work.

SimuFlite's customer reps offer service comparable to what you'd find in a five-star hotel. They'll help you arrange hotel accommodations, book a flight, get a car, make dinner reservations and get tickets to the ballgame.

Even before customers show up to train, they can access SimuFlite's "pre-arrival" services online, including ground

school training, Emergency Recall Drills, and technical publications access.

Once you're on-site, it gets even better. Designed with the customer's peace of mind at the fore, the clean, modern two-story central hall of the main wing is a lovely, quiet area. (The loudest sound you'll hear is the two-story cascading fountain.) Services are top-notch. There's an excellent dining hall—the stories swapped at lunchtime are not to be



missed—large and comfy relaxation lounge, and a world-class aviation library filled with technical publications.

I spent a couple of days at SimuFlite DFW recently. I had a chance to tour the impressive facility, fly in three different sims, two of them Level D full motion units, one for the Cessna CitationJet and the other for the Gulfstream G-V. I also stopped by one of the technologically advanced classrooms to take in some ground training in G-V systems. And over the course of a couple of days, I had a chance to see firsthand just how business is done at SimuFlite, and it's an impressive experience.

A History of Growth

SimuFlite got its start in 1984 as what, it claims, was the largest aviation startup venture to date. It established itself in the hub airport in the middle of the country, DFW, with a state-of-the-art training center equipped with a single simulator, a Level-C Lear 35/36 full-motion simulator. The next year SimuFlite added maintenance training, still a cornerstone product, and within 10 years SimuFlite had 18

bays and the first FAA-approved Level D simulator, for a Bombardier Challenger business jet. By 1999, the firm had built a new wing and expanded to 30 bays, and Bombardier announced it would conduct pilot and maintenance training at SimuFlite DFW. The marketing/training relationship is ongoing. Bombardier today leases an entire wing of the facility and clients there enjoy the same quality of training as SimuFlite's. "The two wings," SimuFlite's director of sales Bill Dolny told me, "are separated by a single door, and that door is never closed."

In 2000 flight simulator manufacturer CAE bought SimuFlite. It was a natural pairing, and the new venture spawned new business, including the company's first overseas training center, in Dubai, with training available in Gulfstreams, Hawkers, Boeings and Airbuses.

By 2002 SimuFlite had expanded up to 426,000 square feet at its DFW location and increased to 36 the number of bays there; this to go along with 85 classrooms.

CAE SimuFlite is growing, adding a pair of flight training centers, one in Burgess Hill, U.K. (with sims for the Falcon

900EX EASy and the Falcon 2000EX EASy), and the other in Morristown, New Jersey, (Beechjet, Falcon 900EX EASy and the Falcon 2000EX EASy) with training to begin later this year.

Size Does Indeed Matter

With its 426,000-square foot DFW facility, SimuFlite claims to have the largest business aviation center in the world. The benefits of great size might be limited in terms of one pilot's or one crew's experience, but the benefits are enormous for flight departments that operate more than one kind of jet. Even a two-airplane flight department can save significantly on travel expenses and time away from the flight line by training at a facility that offers training in all the airplanes it operates. And SimuFlite trains on a lot of platforms, nearly 50 in all, counting Bombardier's training wing—instead of just a few at each center.

The Shiny Equipment

The investment in developing and running a flight training facility the size of SimuFlite DFW is huge, hundreds of millions huge, and SimuFlite is not the cheapest place in the world to train. But in this case, you get exactly what you pay for, top-notch training. One visit and it's clear that the equipment there has a lot to do with both cost and value.

For instance, the amazing Gulfstream G-V simulator at SimuFlite (which beautifully simulates an amazing airplane) doesn't cost as much as a real G-V, but that's the exception to the rule. The cost of a new full-motion simulator can go as high as \$15 million, and many of the sims at the center cost more than the actual airplane does. These full-motion, Level D sims are technological marvels, with incredibly realistic displays, actual full flight decks (with instructor consoles behind), and data and video recording capabilities. And while the engine maintenance costs are low at SimuFlite, their equipment is impeccably maintained, and that's not cheap either.

SimuFlite features more than a dozen non-motion flight-training devices with large displays. Even without the motion, the effect is very convincing, and pilots quickly get into the challenges of the flying.

In fact, SimuFlite is the premier training facility for high-value cabin-class piston and turboprop twins, and much of the training for these airplanes is conducted in



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Harvey calls it "...the lightest most comfortable headset I have owned. They provide the clearest and best noise reduction of any ANR set I have owned."

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difference. The invention of the TriPort® headset structure allows for superior noise reduction in a lighter, smaller headset (weighing 12 oz.) with 50% less clamping force than most R headsets. The solid magnesium head-weight, yet durable enough to survive the O tests. A sheepskin cushion, advanced padded, angled earcups all contribute fit. CASA 212 pilot Kevin McBride



adds, "When I tried my buddy's Bose X it was so light, so comfortable, I just had to have one." Try it yourself. We think you'll agree.

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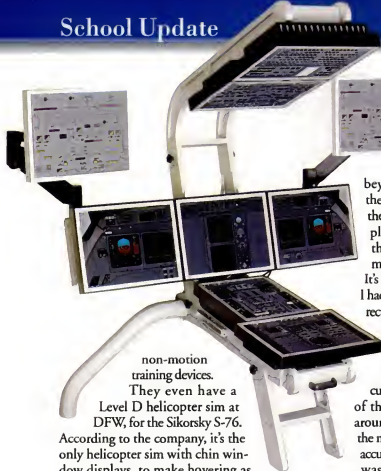
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non-motion training devices.

They even have a Level D helicopter sim at DFW, for the Sikorsky S-76.

According to the company, it's the only helicopter sim with chin window displays, to make hovering as realistic an experience as possible.

Simfinity

No matter where they train, pilots spend more time in the classroom than they do in the sim, and SimuFlite early on saw the opportunity to leverage the capabilities of their simulator software and graphics in order to make the classroom experience more productive, more effective and more interesting. The result was the cleverly named "Simfinity," which SimuFlite launched just a few years ago, and which is available for five different airplanes.

There are two major components to Simfinity: the simulation-based classroom and the Simfinity Virtual Simulator.

The simulation-based classroom features a wall of large-screen displays that the instructor can access through a workstation at the podium. When teaching a lesson about emergency procedures, for instance, he can display the cockpit of the airplane on the screens and then—and this is revolutionary—fly the airplane from the podium. Using the mouse, the instructor can click on the images of the various handles, controls and warning systems, all of which behave just as they do in the real airplane. So instead of describing how things work, or showing pictures of certain components and then describing their functions, the instructor can actually demonstrate every one of

them. The system also allows the instructor to call up information and photography

beyond the capabilities of the sim. Want to see where the fire bottles are? A couple of clicks and you're there. And much of that material is interactive, too. It's an amazing system.

I had the chance to sit in on a recurrent training session for the Gulfstream G-V.

The other "students" were sim instructors going through their recurrent training, and much of the discussion revolved around known "issues" with the manual, discrepancies, inaccuracies and ambiguities. It was worthwhile stuff, and made all the better through the Simfinity classroom.

The other big Simfinity application is the procedures trainer, essentially a group of large, touch-screen LCDs arrayed around the pilots' seats. The procedures trainer allows the pilot and instructor to go over nearly all of the same kinds of systems-training tasks that they might perform in the full-motion simulator but at a small fraction of the cost (to both student and training provider).

Maintenance Training

Another product that SimuFlite offers is its world-class maintenance training. The one-location-serves-all approach benefits pilots who are also mechanics but mostly flight departments who can send both their maintenance and flight crews to the center for recurrent training. Available at the center are maintenance courses for 25 different airframes, and there are courses in avionics maintenance (some aircraft-specific), electrical systems, RVSM, diag-

nostics and practical troubleshooting techniques. (And maintenance training doesn't stop there. During their training, pilots are also taught many practical troubleshooting techniques to allow them to diagnose problems on the ground when away from home.)

A Day in the Sims

The plan for my visit to SimuFlite was to try to get (over a two-day period) a feel for what an actual training experience might be like at the DFW center. We scheduled a little time in three different platforms: a non-motion flight-training device for the Cessna 421 piston twin and two Level-D sims, one for a CitationJet and one for a Gulfstream G-V. Even though my instructors didn't program in any V₁ cuts, engine fires, depressurizations or yaw damper failures, I was kept plenty busy simply flying approaches in airplanes I'd never flown before.

The most challenging by far was the Cessna 421, which takes a lot of legwork, I discovered, to keep on heading with an engine out. The simulator for that airplane, despite being the only non-motion one I flew, was remarkably realistic. At one point a non-flying associate took the cockpit controls for a few minutes, and after winding our way around the sky for a time, during which she did remarkably well for a non-pilot, I started to get a little queasy, proof that the actual motion isn't completely necessary. The visuals, especially the weather effects—why is the weather always bad when you're flying in the sim?—and the flight control software mimicked the real world performance of the airplane well.

Next up was the CitationJet, an airplane in which I'd love to get a type rating at some point, so my time in it was of particular interest to me. As you might expect with a \$10-million-plus full motion flight simulator, the experience, the sights, the sounds, the horns, pitch and roll movements and more, was incredibly true to life. I even found myself on several occasions doing things like checking to see if the wings would clear obstacles while making a taxi turn, it not having occurred to me that there were no wings or obstacles. It's an incredibly convincing illusion, and I found it easy to lose myself in the flying, forgetting almost completely that I wasn't in a "real" airplane.

The highlight of my visit, however, was my almost two-hour time block in the



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Leather Slim Line FLIGHT GEAR Bag	2078A	\$125.00
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Leather Dual Headset Case

A perfect bag for those with less to carry, this Case easily accommodates headsets, GPS's, flight computers and more in the two padded interior sections. Exterior pockets provide quick access to charts, flashlights, pens or fuel testers. Great for flight instructors. Measures 9" l x 8 1/2" w x 9 1/2" h.

Leather Dual Headset Case	2160A	\$49.95
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School Update

Gulfstream G-V sim. As you might know, the G-V has Gulfstream's Enhanced Vision System, an infrared-based enhancement to the cool-by-itself Head Up Display (HUD) that allows the pilot to see through clouds and dark of night. Of course, the G-V has other high-tech features, including autothrottles, and my goal wasn't to master the airplane, just to experience it. My instructor thoughtfully put us on the runway in Anchorage, and while he initially set the weather to day/VFR, the weather, as is almost always the case in sims, got much worse as the day wore on. By the end of our session, I was making a circle-to-land approach to Anchorage at minimums. Despite the need to maneuver fairly aggressively to make the landing, I was able by then to get the airplane down on the ground in one piece, a testament to the educational value of these devices. No wonder the FAA awards type ratings based on sim experience alone.

We also spent some time trying out the enhanced ground prox, flying directly at a mountain peak and waiting, waiting until the verbal command to "pull up." The commanded climb attitude is startling to a non-jet pilot, and time is absolutely of the essence in such a situation. Our resultant near miss, despite my less than optimum performance, was proof of the system's value, and the exercise was another example of real-world emergencies that there's no good reason to go out and practice in the real world.

Looking Ahead

CAE SimuFlite is a company on the move, and its trajectory couldn't look much better. While it has always positioned itself as a one-source training solution, thanks to its owner, CAE, and to a trio of new training centers around the world, the company has opened itself to new dimensions of growth. And with centers in the U.K. and the Middle East, many customers who have come to call DFW home twice a year will now be able to spend some quality time in Burgess Hill or Dubai.

While the facilities and faces might change with the growth, the service, Dolny stressed, won't. The vision of training, the mission to provide world class service on an individual basis, will continue to inform all of CAE SimuFlite's ventures near or far.

For more information about SimuFlite DFW or any of its other locations, visit simuflite.com.



Questions from the FAA's
Airmen Knowledge Test

Quiz Time

HERE ARE THE QUESTIONS FROM THE FAA's computer-based Instrument Pilot Airmen Knowledge Test. The questions, including the three choices, are theirs, the answers on the side of the page are ours.

1. What is the required flight visibility and distance from clouds if you are operating in Class E airspace at 9,500 feet msl with a VFR-on-top clearance during daylight hours?

- A**—3 sm, 1,000 feet above, 500 feet below, and 2,000 feet horizontal.
B—5 sm, 500 feet above, 1,000 feet below, and 2,000 feet horizontal.
C—3 sm, 500 feet above, 1,000 feet below, and 2,000 feet horizontal.

2. When airspeed is decreased in a turn, what must be done to maintain level flight?

- A**—Decrease the angle of bank and/or increase the angle of attack.
B—Increase the angle of bank and/or decrease the angle of attack.
C—Increase the angle of attack.

3. Aircraft approach categories are based on

- A**—certificated approach speed at maximum gross weight.
B—1.3 times the stall speed in landing configuration at maximum gross landing weight.
C—1.3 times the stall speed at maximum gross weight.

4. What does the symbol T within a black triangle in the minimums section of the IAP for a particular airport indicate?

- A**—Takeoff minimums are one mile for

aircraft having two engines or less and one-half mile for those with more than two engines.

B—Instrument takeoffs are not authorized.

C—Takeoff minimums are not standard and/or departure procedures are published.

5. What determines the structure or type of clouds which form as a result of air being forced to ascend?

A—The method by which the air is lifted.

B—The stability of the air before lifting occurs.

C—The amount of condensation nuclei present after lifting occurs.

6. Except when necessary for takeoff or landing or unless otherwise authorized by the Administrator, the minimum altitude for IFR flight is

A—3,000 feet over all terrain.

B—3,000 feet over designated mountainous terrain; 2,000 feet over terrain elsewhere.

C—2,000 feet above the highest obstacle over designated mountainous terrain; 1,000 feet above the highest obstacle over terrain elsewhere. ✈

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Aftermath

"In Fact, Terrible!"

ALTHOUGH INSTRUMENT PROCEDURES are designed to ensure safety, a good many pilots come to grief executing them. In some cases, mishaps are due to intentional deviations from prescribed procedures, for instance descending below minimum altitudes in search of an incompletely glimpsed runway. In some, the deviations are unintentional: A pilot tunes the wrong VOR frequency, misreads the altimeter, or fails to keep up with the needles on the last bit of the ILS. In a few cases, however, something more fundamental goes wrong. The pilot crumbles.

A case in point is that of a Baron 58P that made a short flight from Jeffco Airport, in the northwestern suburbs of Denver, to Colorado Springs (COS), about 70 nm distant, on a summer morning eight years ago. The weather at Jeffco

ing to the left of the localizer, and said, "Are you showing yourself on the localizer? I show you east of it, proceeding away." The pilot agreed, and, on being asked his intentions, said that he would make a missed approach. The tower controller instructed him to turn left to a heading of 090 and to climb to 9,000 feet. A few seconds later, the tower controller pointed out to the pilot, whose Mode C readout indicated that he was at 8,000 feet, that he was below the minimum vectoring altitude for the area and should begin his climb immediately. The pilot acknowledged the instruction.

The controller must now have sensed that all was not well with the flight, because he turned his attention to a Citation that was following the Baron down the ILS. "Climb and maintain 10,000,"

a low hill about five miles north of the airport. The National Transportation Safety Board's report on the accident does not give the elevation of the crash site, but the airplane's altimeter read 6,720 feet; the altimeter setting was that of Jeffco, not Colorado Springs, but the difference between it and the local setting was inconsequential. A 1,000-foot long ground scar, oriented between 60 and 80 degrees, indicated that the Baron had finally made the left turn requested by the controller and was in more or less level, controlled flight when it hit the ground. Chordwise scoring and bending of the propeller blades indicated that the engines had been developing power. The airplane had been properly configured for the approach, with 15 degrees of flap and the gear down.

The NTSB's report on the accident does not give the elevation of the crash site, but the airplane's altimeter read 6,720 feet.

when the pilot and his passenger departed was VFR, but when they began the approach COS was reporting a 100-foot ceiling with one-half to one-mile visibility in light rain and mist.

The en route portion of the flight was apparently uneventful, except that the pilot failed to obtain a taxi clearance before setting out for the runway at Jeffco. About 20 minutes after taking off, the pilot contacted COS approach and received vectors to join the ILS for Runway 17L, together with an instruction to descend to 9,000 feet and to reduce speed by 20 knots for an MD-80 three miles ahead. The controller told him that the visibility on the ground was about three-quarters of a mile, but did not provide any other weather or airport information, an omission for which he was later faulted by the National Transportation Safety Board's air traffic control specialist.

The approach appeared normal to the controller, who handed the flight off to COS tower without issuing an approach clearance. About two minutes later, the tower controller observed the Baron drift-

he told the pilot of the jet. "Start the climb now. Traffic 12 o'clock, two miles. I can't tell what he's going to do." The Citation pilot confirmed that his TCAS (traffic collision avoidance system) intermittently reported the presence of the other airplane. "He looks like he's going to pass underneath us here."

The tower controller then spoke to the approach controller. "I'm climbing [the Citation] to 10. That Baron's making a reverse course. I don't know what he's doing ... He's supposed to be going on a 90 heading, but I don't know ... I'm trying to do something with him."

The tower controller now asked the pilot of the Baron for his heading. "One nine zero heading to 090," was the reply. "Start a left turn now, you're headed towards the mountains," the controller warned, and the pilot acknowledged. That was the last communication from the Baron. About a minute later, the airplane disappeared from radar, and the tower controller told the approach controller that he thought the Baron had "augured in."

Searchers soon found the wreckage on

The Citation that had been following the Baron on the ILS went around and flew a second approach, successfully. The captain later provided the NTSB with a written statement of the event; the most significant piece of information that he added was that there was "stress" in the pilot's voice and it sounded like "controlled panic."

The NTSB obtained the pilot's logbook and investigated his flying history. It turned out to be a somewhat checkered one. He had begun taking flying lessons in the spring of 1994, three years before the accident, and earned his private license in four months flying a Cessna T206. Four months later, in December, he began working on his instrument rating, and took the practical test three months after that. He failed because of "deficient approach procedures." Two weeks later he passed a retest.

Three months after that, in July, 1996, he bought the pressurized Baron and soon began taking multiengine flight instruction. In October, still without the multi rating, he inadvertently landed the

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Baron gear up in Colorado Springs.

At the insistence of his insurance company, he next attended a five-day training course in the B58 at a major academy. The course included over 15 hours of ground school and nearly 13 hours of simulator time. Of 10 simulator sessions, he was graded unsatisfactory in five, including various types of IFR approaches. The instructor wrote, "VFR only. Could not do IFR very well—in fact, terrible!" The pilot's graduation certificate bore the notation "VFR only."

The Baron was still in the shop, having had both engines overhauled as well as the belly-landing damage repaired, when the pilot embarked on an accelerated multiengine flight course in Texas. He failed the flight test three days after starting the course, but passed it two weeks later. A week after that, the Baron was ready and he resumed flying it. At the time of the accident, five months later, he had put about 105 hours on the airplane, about a quarter of it in instruction, and had logged 21 instrument approaches as pilot-in-command.

We don't know what happened to ruin the pilot's last approach. The weather was low, but it was not stormy, windy, or icy. It was daytime. Traffic was apparently not congested, and the flight had not been subjected to reroutes or holds. There is no indication, either in the wreckage or in the pilot's communications, of a mechanical, electronic, or instrumentation malfunction. In sum, none of the difficulties or distractions that may beset an instrument pilot were present.

We also don't know what it was about his instrument approaches during simulator training that instructors found so unsatisfactory, and so we cannot say that he had a tendency to make a certain mistake. The wide range of procedures on which he was found unsatisfactory, however, and the curiously emphatic stricture that he fly VFR only, hint at a broad lack of aptitude.

The ILS approach presents two basic challenges. One is that of navigating to the approach course and establishing oneself on it at the correct location and with an appropriate configuration and speed. In this case, vectors made the navigation phase easy. The airplane was appropriately configured, and as far as the approach controller could tell the ILS was normal up to the point where he handed the pilot off to the tower.

The second challenge is that of keeping the needles centered with progressively smaller corrections as you approach the runway and their sensitivity grows. But the pilot's troubles began several miles from the runway, where the crosspointer sensitivity is low and deviations are easily corrected. Why did he drift off the localizer in the first place, and, having announced a missed approach and received a vector, why did he not immediately turn and climb?

A clue may be found in the Citation pilot's interpretation of the pilot's voice as betraying "controlled panic," and in the tower controller's public manifestation—"I can't tell what he's going to do"—of lack of confidence in him. If the Baron pilot sounded rattled, most likely he *was* rattled. Fear takes different forms in different people, but it seldom improves performance. It can, in fact, have effects that people who have not experienced them find hard to imagine, like rendering a pilot unable to interpret the meaning of the numbers on a DG, decide which way to turn to reach a certain heading, or connect manifold pressure, throttle position and altimeter needle movement in the logical way that normally guides us in going up or down. Simple, basic mental functions become impaired; decision-making ceases, and the pilot may simply "freeze," or fixate for long periods on simple actions without moving forward.

While it is impossible to know that this is what actually happened, it is a reasonable hypothesis. This may have been the pilot's first non-simulator approach to minimums; and the fact that he would be descending very close to the ground, along a glidepath for the tracking of which he had previously displayed a noteworthy lack of aptitude, may have struck home with sickening force. That he declared a miss early in the approach hints that he was not happy being where he was; that he then failed to climb suggests an overwhelming and deadly confusion.

This article is based solely on the National Transportation Safety Board's report of the accident and is intended to bring the issues raised to the attention of our readers. It is not intended to judge or to reach any definitive conclusions about the ability or capacity of any person, living or dead, or any aircraft or accessory. ✈

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Starting at \$9,990, Avidyne's new TAS600 Series Traffic Advisory Systems make premium performance, active-surveillance traffic alerting affordable for virtually every general aviation aircraft.

When coupled with an Avidyne display such as the EX500 (shown here), the TAS600 can also display transponder squawk codes, as well as N-numbers of Mode S-equipped aircraft, making it even easier to identify specific targets.

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*New Collins Pro Line 21 avionics suite is great,
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I WAS LOOKING FORWARD TO FLYING THE NEW AVIONICS AND full-authority digital engine controls (FADEC) in Cessna's new Citation CJ1+ and 2+ jets, but I wasn't expecting much change in the airplane's performance. After all, I thought, this is all about new electronics for the cockpit and the engines, not about power. But I was wrong. The new CJs, particularly the 1+, are substantially more capable in every way.

BY J. MAC McCLELLAN

PHOTOGRAPHY BY PAUL BOWEN





■ Jeppesen charts displayed on the Collins Pro Line 21 MFD are one of the most useful features of the new CJ cockpits. Dual radio tuning units with big knobs and numbers are standard, as are the new digital electronic audio controls on each side.

Instead of just adding faired to control and simplify operation of the engines on the CJs, Cessna took the opportunity to install new models of the Williams FJ44 family of turboprops. The new FJ44-1AP on the 1+ is rated at 1,961 pounds of thrust for takeoff, which is 61 pounds more than the previous engine. On the 2+ engine power is increased by 90 pounds per side. But the thrust gain is not the whole story. It's the optimized design of the engines that makes the difference.

In the new engine on the 1+ Williams has increased the number of compressor and turbine stages and reduced the fan bypass ratio, which together increase thrust at altitude. The bypass ratio—the amount of air the fan propels past the jet engine core—is down from 3.3 to 2.6 in the new engine. Because the fan air exits at a lower velocity it is most effective in producing thrust at low altitude, while the high veloc-

ity exhaust from the jet engine core is best for propelling an airplane at high altitude.

How well do the new CJ1+ engines work? With lots of fuel we were within 1,000 pounds of maximum takeoff weight, and the new 1+ went up at 3,700 to 3,900 fpm in initial climb. Out of 25,000 feet the CJ1+ was going up at more than 2,000 fpm, and despite temperatures aloft that were 6°C above standard, the airplane reached 38,000 feet in just 17 minutes after takeoff. At the top of the climb the true airspeed was 340 knots, and in just five minutes it accelerated to 380 knots true airspeed with a fuel flow of 720 pph. Those numbers are easily 25 to 30 knots faster than a CJ1, and in many cases the previous airplane couldn't reach FL 380 until fuel burned off. Fuel flows are about 40 pounds higher in the 1+, but the speed increase offsets that enough so the range actually increases.

The engine on the new CJ2+ is actually a derated version of the same engine that powers the larger, and heavier CJ3. The FJ44-3A-24 on the new 2+ is rated at 2,490 pounds thrust for takeoff compared to 2,780 pounds on the CJ3. The extra high altitude thrust of the new engine makes a difference in the 2+, but since the CJ2 was always a good climber the change is not as dramatic as on the 1+. The new 2+ can hit 5,000 fpm on initial climb and, despite being held level for about three minutes at 22,000 feet, we leveled at 40,000 feet in just 17 minutes after takeoff. True airspeed was 330 knots at level off, and in three minutes was climbing past 410 knots. With power set at max cruise the CJ2+ accelerated to 418 knots true airspeed at which point we hit the new maximum Mach operating limit (MMO) of Mach .737 and had to reduce power.



■ The red "tow-fly" lever on the nose gear is gone so there is one less thing for CJ pilots to remember to check during preflight, or to set for tow when you park. Baggage can be loaded from either side of the nose, but new avionics use some of the space.

The performance the new engines deliver is wonderful, but nearly as nice is the ease of operation provided by the faders. In the earlier CJs you were constantly fiddling with the thrust levers to set power on takeoff and throughout the climb. Hardly a minute would go by without need for an adjustment in N1 fan speed as the altitude changed. Now, with the faders, you simply push the levers to the takeoff detent, once safely up and climbing pull back to the maximum continuous power detent, and that's it. In cruise you can use the max cruise detent, or set any intermediate power. The level of workload reduction is amazing, and particularly welcome in airplanes that are often flown with a single pilot.

Though the engines account for most of the performance improvement, Cessna aerodynamicists also contributed with drag reduction. The most important

change is to the nacelles and engine-mounting pylons. The other improvement is a fairing around the main gear wheel wells that smoothes airflow over the tire.

The engine nacelle on the CJ1+ is completely new, while the nacelle on the 2+ is the same as the CJ3. If you look closely you'll see that the new 1+ nacelle has a continuously changing shape while the old one had a long constant section. The old nacelle reflected the thinking of the late 1980s, but Cessna and all other jet makers have learned a lot about drag control in this critical area since then.

The new engine pylon is subtly reshaped to better conform with local airflow, and also to account for the thrust attenuators that have been removed from the 1+ and 2+. On the earlier models there is a hydraulically actuated paddle that extends in the engine exhaust stream to attenuate engine thrust when idle



■ The engine nacelle on the CJ1+ has been totally redesigned with a new curvy shape that helps to reduce drag. Note that the thrust attenuator is missing on the newly designed engine-mounting pylon. Louvers at the wing tip allow the hot air used to protect the wing from ice to escape.





power is selected for taxi, or during braking after landing or an aborted takeoff. The attenuators were useful because the mechanical engine controls could not reduce idle to the desired low level so stopping distance increased due to residual thrust. The fadeces now reduce engine idle power to a level where the attenuators are not necessary. Elimination of the attenuators saves at least 25 pounds of weight and eliminates an entire system with its hydraulic lines, wires and switches.

The other changes in the CJ1+ and 2+ are all inside the cockpit where the completely integrated Collins Pro Line 21 system is now standard. The earlier airplanes had Pro Line 21 flat panel displays, but lacked the FMS-3000 flight management system, and IFIS-5000 integrated flight information system that pull everything together, plus provide Jeppesen charts, XM Weather and many other features. Also, the third flat-panel display for the copilot's side is now standard.

The complete Pro Line 21 cockpit made its Citation debut in the CJ3. The system also includes new digital com and nav receivers with dual radio tuning units.

GPS is, of course, standard, along with electronic non-moving gyros. But the dual "terrestrial navigation receivers," as Collins calls them, are still there to receive VOR, ILS, marker beacon, and even ADF signals. The flight management system (FMS) will manage the terrestrial receivers, just as it does all nav sensors, or you can still tune them the old-fashioned way, if you like. An optional Garmin GPS-500 can be installed to provide cost-effective FMS redundancy for international operations.

The most obvious avionics change is the integrated information system, which many call the file server, because that's what it really is. Just like the file server in any computer network, the IFIS 5000 allows pilots to retrieve all kinds of information for display on the big eight- by 10-inch flat panel multifunction display (MFD) in the center of the panel. The Jeppesen approach charts and airport diagrams are very nice because the display size allows them to appear large enough to see clearly without zooming on a standard approach plate. A little airplane symbol represents your present position



■ The standard CJ1+ interior has four place club seating with a single side facing seat directly aft of the copilot. A lavatory with a flushing potty at the aft of the cabin is also standard. Cessna locates two cup holders at every seat.



on the chart, whether you're in the air, or taxiing. To zoom in for a closer look a joystick commands a box outline that you position over the area of interest so you can see how much of the chart you intend to enlarge.

In addition to the actual electronic Jepp charts, the file server feeds all manner of airspace and land data to the MFD. You can see major geographical features such as rivers and lakes, political boundaries such as state borders, all high or low airways, special use airspace and so on. Many of these features have been available in some other systems for some time, even on some portable GPS receivers, but this is one of the most complete systems offered in a jet. The rules require jet pilots to have a backup source for navigation information and that rule can be met by carrying along an electronic flight bag (EFB), which is nothing but a portable computer with the charts and other information loaded in memory. You don't have to use the EFB, only have it at hand in case there is a failure of the primary avionics.

The interior appointments of the new CJ+ models are largely the same as in the

■ **Preflight items such as landing gear and brake emergency pressure, power brake accumulator pressure, and so on are easily checked inside the nose baggage compartment.**

Citation CJ1+ & CJ2+

The airplanes flown for this report are the first two completed off the Cessna production line. They include the Collins Pro Line 21 integrated avionics suite as standard equipment, including all necessary avionics such as terrain awareness, collision warning and enhanced navigation equipment. Both airplanes are eligible for single-pilot operation if the pilot is properly certified. All performance information comes from the airplane manuals and reflects standard day conditions at maximum weight unless noted. Because many CJs are flown by a single owner pilot we did not include the weight of the pilot in the empty weight as is the norm in jets.



CITATION CJ1+

Typically equipped price... \$4.29 million
Engines... Williams FJ44-1AP,
1,961 lbs thrust each

TBO	3,500 hrs
Passenger seats	5 (typical)
Cabin height	4.8 ft
Cabin width	4.8 ft
Cabin length	11.0 ft
Overall length	42.6 ft
Overall height	13.8 ft
Wingspan	46.8 ft
Wing area	240 sq ft
Wing sweep	0 degrees
Wing aspect ratio	9.2
Max ramp weight	10,800 lbs
Max takeoff weight	10,700 lbs
Typically equipped empty weight	6,690 lbs
Max useful load	4,110 lbs
Max zero fuel weight	8,400 lbs
Max payload	1,710 lbs
Max fuel capacity	3,220 lbs
Payload, max fuel	890 lbs
Max landing weight	9,900 lbs
Wing loading	44.6 lbs/sq ft
Power loading	2.7 lbs/lb
Ceiling (certified)	41,000 ft
Pressurization	8.5 psi
Sea level cabin to	22,027 ft
Takeoff runway	3,250 ft
Rate of climb all engines	3,290 fpm
Rate of climb one engine out	906 fpm
Climb to 37,000 ft	19 min
High speed cruise	389 kts
Long range cruise	330 kts
IFR range at max cruise thrust	1,300 nm
Landing distance	2,590 ft
V _{MO} /M _{MO}	263 kts/Mach .71

CITATION CJ2+

Typically equipped price... \$5.78 million
Engines... Williams FJ44-3A-24,
2,490 lbs each

TBO	4,000 hrs
Passenger seats (typical)	6
Cabin height	4.8 ft
Cabin width	4.8 ft
Cabin length	13.6 ft
Overall length	47.7 ft
Overall height	14.0 ft
Wingspan	49.5 ft
Wing area	264 sq ft
Wing sweep	0 degrees
Wing aspect ratio	9.3
Max ramp weight	12,625 lbs
Max takeoff weight	12,500 lbs
Typically equipped empty weight	7,695 lbs
Max useful load	4,930 lbs
Max zero fuel weight	9,700 lbs
Max payload	2,005 lbs
Max fuel capacity	3,930 lbs
Payload with max fuel	1,000 lbs
Max landing weight	11,525 lbs
Wing loading	47.3 lbs/sq ft
Power loading	2.5 lbs/lb
Ceiling (certified)	45,000 ft
Pressurization	8.9 psi
Sea level cabin to	23,586 ft
Takeoff runway	3,360 ft
Rate of climb all engines	4,120 fpm
Rate of climb one engine out	1,004 fpm
Climb to 37,000 ft	15 min
High speed cruise	418 kts
Long range cruise	371 kts
IFR range at max cruise thrust	1,613 nm
Landing distance	2,980 ft
V _{MO} /M _{MO}	278 kts/Mach .737



■ The easiest way to tell a CJ1+ or 2+ from the earlier model, when they don't have this demonstrator's paint scheme, is to look at the engine exhaust nozzle and not see a black thrust attenuator paddle.

previous models except Cessna has been continuously improving the already high quality of its work. Extremely long life LED lights are now standard in the overhead. The standard CJ1+ interior has a club-four seating arrangement with a side facing passenger seat behind the copilot. The standard CJ2+ has a club four plus two forward facing seats. A variety of refreshment center options are available.

Maximum takeoff weight increased by

100 pounds to 10,700 in the 1+, and 125 pounds to 12,500 in the 2+. The typically equipped empty weight in the 1+ went up only 20 pounds, so 80 pounds of additional useful load is available for passengers or more optional equipment. The typically equipped empty weight on the 2+ increased by 95 pounds so the useful load goes up by 30 pounds. One important weight change on the 2+ is moving the zero fuel weight from 9,300 to 9,700 pounds. Some pilots of the original CJ2 were finding that they couldn't haul as much payload as they wanted on shorter trips because of bumping up against the zero fuel limitation.

Despite the weight increases to both airplanes, runway performance actually improves. Required runway for takeoff and landing is reduced at least a little under all conditions. Part of the explanation for less runway at higher weights is the increased engine thrust for takeoff. But the engines also play a part in shortening landing distances because the faecers reduce idle thrust, allowing the new airplanes to touchdown sooner without the residual idle thrust pushing them down the runway. Cessna has also worked on the brakes and they are excellent on the 1+, and better on the 2+. The brakes on the CJ2 have never been as smooth and easy to operate—particularly at taxi speeds—as pilots want, but in the 2+ they are certainly acceptable.

With no increase in fuel capacity both new CJs have longer range. In still air with enough fuel to fly to an alternate airport 100 nm away, the CJ1+ has a

range of 1,300 nm, up from 1,248. And the 1+ can fly the trip in less time thanks to higher cruise speeds. The range comes from the new airplane's ability to climb directly to FL 410 when the previous CJ1 could not get above FL 390 at best, until fuel burned off. The drag reduction of the new nacelles, engine pylons and wheel well fairings also pays off on the long trips. The IFR range on the CJ2+ goes up from 1,550 nm to 1,613 nm and a quicker climb to the fuel efficient altitude of FL 450 explains most of that gain.

There is no pilot-type rating change for the new CJs, but FlightSafety has added time in its recurrent training courses to teach the new avionics systems to experienced CJ pilots.

Cessna has also continued its recent trend of upgrading its Citation models while actually lowering the price. The CJ1+ at \$4,290,000 and the 2+ at \$5,780,000 cost less than the previous model with similar equipment that has now become standard. But that comparison is incomplete because many avionics features were not available before, not to mention the extra performance the new airplanes deliver.

The CJ1 and 2 were being pinched on both sides with Cessna's new light jet Mustang snapping at the heels of the CJ1 from the bottom, and the CJ3 delivering more capability than the CJ2 at the top. But with the improvements in the + models the new CJs have carved out a bigger niche for themselves, giving pilots many useful steps to make on their way up the Citation line. ▲



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The Envelope, Please

BY TOM BENENSON

It seemed like a simple exercise. With a masters degree in drama, a minor in film and television, and post graduate work at the New York University institute of film and television, I thought I was qualified for the assignment to make a list of the best aviation movies.

My first thought was that there couldn't be *that* many films with aviation themes from which to choose. Some movies sprang quickly to mind, triggering the memories of others. But then a Google search indicated it wasn't going to be as easy as I'd thought. I found a list of movies with an aviation theme that was compiled by Susan Nicosia at Daniel Webster College. The list (http://faculty.dwc.edu/nicosia/apcm_list_of_aviation_movies.htm) includes some 350 movies in alpha-

betical order from *Above and Beyond* to *Zero Hour*.

There are some obvious classics and there are others that, while featuring impressive air-to-air photography and exciting aerial shots, fall apart when the characters are on the ground. War has been the mother of invention of aviation advances and war is a popular subject of movies with aviation themes—and some of the best.

Even the best films often have technical problems that mar the realism, but movies—at least for me—are best viewed from an attitude of suspended belief. And I'm good at that. I'm sure you'll have different ideas of what the best aviation movies are, but, for what it's worth, here are my choices (in no particular order) with the name of the director and the major cast members.

Hell's Angels (1930)

Directed by Howard Hughes
Cast: Ben Lyon, James Hall, Jean Harlow
The story follows two brothers, Roy and Monte Rutledge, who are attending Oxford University when the first World War begins and they enlist in the RAF. The two volunteer for a mission to bomb a German munitions factory.

The film, at \$3.8 million, was the most expensive at the time, but the air combat scenes that required more than 125 pilots were worth the cost. Reports indicated that three pilots were killed during the filming. The film was made well before computer-generated graphics so what you see is what was there. In addition to the impressive air battles, the film also marked the debut of Jean Harlow.

The Flight of the Phoenix (1965)

Directed by Robert Aldrich
Cast: James Stewart, Peter Finch, Richard Attenborough, Hardy Krüger
A plane crashes in the Sahara Desert after encountering a swarm of locusts. One of the passengers who claims to be an airplane designer proposes rebuilding the airplane from the wreckage.

The film provides an interesting view of "pilot in command" as Jimmy Stewart, the pilot and Hardy Krüger, the designer, switch roles during the re-building of the airplane.

Paul Mantz, a famous stunt pilot, was killed during filming. Mantz was to make a low pass, running his landing gear along the ground, so it would appear the airplane was taking off. On the second take the plane crashed and Mantz was killed.

The original airplane, a C-82, was replaced with an O-47 to finish the flying scenes. The plane that Mantz flew was put together from a Beech C-45 and a T-6 and, while it appeared flimsy, actually had passed an FAA inspection. Originally, Mantz' partner in Tallmantz Aviation, Frank Tallman, was slated to make the flight, but a fall and a shattered kneecap precluded that.

The Spirit of St. Louis (1957)

Directed by Billy Wilder
Cast: James Stewart
The film details Charles Lindbergh's early days of flying the mail and his solo flight across the Atlantic from New York to Paris in 1927.

Although we all know the flight was successful, it's hard not to suck in your breath as you watch the over-loaded Ryan stagger into the air on takeoff. The flashbacks do give some relief, and it's impressive that although so much of the plot takes place in the airplane's cockpit, we willingly ride along with Lucky Lindy. There's a question of whether the encoun-

ter with ice actually happened on the transatlantic flight or was encountered on the flight from San Diego to New York.

The Great Waldo Pepper (1975)

Directed by George Roy Hill
Cast: Robert Redford, Bo Svenson, Susan Sarandon
Robert Redford plays a barnstorming pilot who missed his chance to fly in WWI and ends up trying to prove his ability while filming a dogfight in a movie about the war.

The flying makes this film. The "cast" includes live performances by replicas of the Curtiss Jenny, Sopwith Camel, Standard E-4 and Fokker Triplane among others. The stunt pilots were from Tallmantz Aviation (formed by Frank Tallman and Paul Mantz). Mantz, as mentioned earlier, was killed filming "Flight of the Phoenix" in 1965, and Tallman died years later in a crash in the mountains of Southern California.

Airport (1970)

Directed by George Seaton
Cast: Burt Lancaster, Dean Martin, Jean Seberg, Jacqueline Bisset, George Kennedy, Helen Hayes
Arthur Haley's best selling novel about an airliner that is crippled with control problems (by a bomb) and has to land on a runway that's blocked by an airplane stuck in the snow.

A few more of my favorites

Wings (1927)
Only Angels Have Wings (1939)
Thirty Seconds Over Tokyo (1944)
Twelve O'clock High (1949)
No Highway in the Sky (1951)
Flying Leathernecks (1951)
Breaking the Sound Barrier (1952)
The Dam Busters (1954)
Fate is the Hunter (1964)
Blue Max (1966)
Battle of Britain (1969)
The Right Stuff (1983)
Flight of the Intruder (1990)
Apollo 13 (1995)
The Tuskegee Airmen (1995)
Fly Away Home (1996)
Pushing Tin (1999)
Black Hawk Down (2001)
Pearl Harbor (2001)

The movie manages to be a pretty fair depiction of the inner workings of a busy airport. The radio calls are realistic, although they're a bit hokey with the controllers on the ground shown in insets between the pilots. The movie was shot at the Minneapolis/St. Paul International Airport and there is a Runway 29, which was the one the pilots insisted they needed to land on.

This movie is credited with spawning the genre of airplane/airport disaster movies.

The High and the Mighty (1954)

Directed by William A. Wellman
 Cast: John Wayne, Robert Stack
On a flight from Honolulu to San Francisco, a four-engine Douglas DC-4 suffers an engine explosion that results in a loss of fuel, bringing into doubt the flight's ability to reach its destination. John Wayne, as the copilot, insists they'll make it.

The film script was written by Ernest Gann and was based on his novel. So, almost needless to say, the aviation sequences are accurate and realistic. The interaction between the pilot, Robert Stack, who comes undone in the emergency and John Wayne, the copilot who has to take over, is frequently used to point out good and bad examples of crew resource management.

Always (1989)

Directed by Steven Spielberg
 Cast: Richard Dreyfuss, Holly Hunter, Audrey Hepburn, John Goodman
Pete (Richard Dreyfuss) is killed during a water bomber mission and returns as an invisible ghost to give advice to his successor, Ted (Brad Johnson) who has romantic designs on Dorinda (Holly Hunter), Pete's intended.

If you can get past the supernatural elements of the film—a remake of the 1943 film, *A Guy Named Joe*, about a World War II bomber pilot—there are some well-done scenes of aerial firefighting in addition to a variety of different airplanes used in firefighting. Pete and Dorinda fly an A-26 Invader, used by the Army Air Corps in WWII. Other airplanes that appear in the film include a PBY Catalina, a Navy rescue and transport plane from WWII; a Cessna 337 Skymaster, also known as the O-2 when flown by the Air Force in Vietnam; a Super Decathlon; and a C-119 Flying Boxcar.

Airplane! (1980)

Directed by Jim Abrahams, David Zucker, Jerry Zucker
 Cast: Robert Hays, Julie Hagerty, Lloyd Bridges, Leslie Nielsen
Ted Striker, who has a serious aversion to flying, having lost fellow pilots in the war, is on an airliner in an effort to woo back his girlfriend, a flight attendant. When the crew and many of the passengers get sick

from a bad meal, Striker has to overcome his phobia and land the airplane.

Many people feel that *Airplane!* is the funniest movie ever made. The film, a spoof of the *Airport* disaster films, makes use of the entire range of comedy including parody, satire, puns and outright silliness. Don't watch it for the aviation scenes, but it will make you smile. "Roger, Roger," "Clearance Clarence" and "Otto pilot" have become part of the lexicon.

Those Magnificent Men in Their Flying Machines, or How I Flew from London to Paris in 25 Hours 11 Minutes (1965)

Directed by Ken Annakin
 Cast: Stuart Whitman, Sarah Miles, James Fox, Red Skelton, Terry-Thomas
In the early days of aviation pilots from all over the world compete in a cross-channel air race for a prize offered by a British newspaper.

Any aviation buff will enjoy watching the vintage airplanes that were assembled and flown for this film. The airplanes include Santos-Dumont's minuscule Demoiselle (the replica is said to have been too small to have a male pilot), the Antoinette and Samuel Franklin Cody's box-like airplane. For most of us, footage of the antique airplanes will be much more interesting than the race but it's a reasonable peg on which to hang the airplanes.

Memphis Belle (1990)

Directed by Michael Catton-Jones
 Cast: Matthew Modine, Eric Stoltz, Harry Connick, Jr., David Strathairn, John Lithgow
The film chronicles the May 17, 1943, 25th mission of the 10-man crew of the Memphis Belle, a B-17 bomber in the Eighth Air Force. If they successfully complete the 25th mission, a bombing run to destroy a Nazi supply factory in Bremen, the crew will be able to rotate stateside.

According to one source, while it looked like a flotilla, there were only five real B-17s flying in the movie; two from the United States, two from France and one that was already in England. Of the five only one was an F-model like the real *Memphis Belle*; the others were G-models that didn't show up until later in the war. The U.S. Air Force was using P-47 Thunderbolts at the time and not the P-51 that shows up before the U.S. Air Force had them in its inventory. ✈

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WEATHER WISDOM



It Comes From a Level of Curiosity...

BY RICHARD L. COLLINS

THE NATIONAL TRANSPORTATION SAFETY Board, in a study of weather-related accidents, singled out weather knowledge and weather briefings as things in need of work. The Board wants better questions on tests, attention to the subject on flight reviews and better weather briefings.

The relationship between pilots and weather is complex. Some pilots want a quick briefing and fly with little understanding of weather. Others study the subject. There's plenty to study, too. We cover weather often in this magazine and others do the same. There are books and video programs about weather. It is far from being a neglected subject. However, a lot of pilots just are not interested in the details. Some are so disinterested that they won't go to the trouble of learning to read the coded weather reports and forecasts. Does that make a safety difference?

I think it does. Flying airplanes is absolutely joined with weather because there, in the weather, is where we do our business. There is no way to logically disagree with the NTSB that work is needed here. It has nothing to do with available information because there is a huge amount of weather product out there. It has everything to do with pilot's use and understanding of that information.

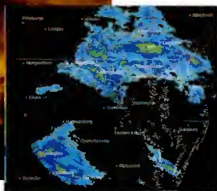
When I think back to the sketchy information we used to have, I marvel at what's available today. Basically, we used to fly with nothing more than sequence

(meters) reports and terminal forecasts. There was no weather radar and the only way to know about the presence of a thunderstorm was if one was reported at an airport. (The criteria was if the observer could hear thunder, there was a reportable thunderstorm.) We used to keep an altimeter in the flight school office, to keep up with rising or falling pressure. High tech stuff.

Those not flying from an airport with a weather office, FAA (then CAA) or Weather Bureau, only saw weather maps in the newspaper and those were a little old for aviation purposes. In fact, we used to use those newspaper weather maps to try to understand what we had encountered on a flight the day before. That wasn't a good way for it to work.

Then, as now, the VFR pilot had the least need for weather wisdom. The V stands for visual, which means if you can see where you are going, the weather is okay. The minute the view gets fuzzy then you are supposed to go back to where it was better and land. Those who don't do that often make the news.

That's not to say that weather wisdom is not a good thing for a VFR pilot to have. An understanding of highs and lows and fronts and how they affect the weather is good for any pilot. It might help a VFR pilot to know that if he is flying toward a front or low-pressure area, the weather will likely get worse. That



would certainly be a time to heed messages from the view out front.

It would also be good for the VFR pilot to know things like the signs of likely fog formation and the fact that when rain starts it might remain VFR for a while, but lower clouds and scud are likely to form in the rain area.

Actually, VFR pilots are doing a far better job of dealing with weather now than in the past. Where the classic "continued VFR into adverse weather" accidents used to greatly outnumber IFR accidents, the reverse is now true. I suspect that the reason this is true is that instrument pilots don't take the demands of flying in actual weather as seriously as they should.

Some feel these accidents shouldn't be called "weather accidents." After all, the weather didn't cause most of them. But when an event occurs in bad weather that would not have occurred in clear weather, there's a message there.

How much of the message relates to weather wisdom? The NTSB can show that pilots who got more thorough briefings might be less likely to have a weather-related accident. They can also show that pilots with lower knowledge test scores might be more likely to have a weather-related accident. But are these things related to not understanding weather, or to just being a lousy pilot in general? Let's look at some of the things we can use to better understand weather.

Weather briefings come in three stages. First is our long-term study of conditions that provides an anticipatory framework of weather expectation. Second is the briefing that we get right before a flight. Third is the continuous weather briefing as we fly along.

A lot of pilots don't do the first briefing, or at least they don't do it consciously. But everyone is bombarded with general long-term forecasts. The most standard is the five-day but there are seven and even

A good weather briefing, no matter how it is delivered, depends on a pilot's willingness to study and learn about weather.

ten-day forecasts. If a person keeps up with these and then compares them with what actually happens, it verifies the fact that long-term forecasts are not particularly accurate.

I have two forms of long-term forecasts that I use to get an idea of what might be coming.

One is found at hpc.ncep.noaa.gov/medt/medr.shtml. There is a lot of stuff here, the most useful being a screen with the projected weather maps for days three through seven. At this site, they call this medium range forecasting. I just looked and for us, in mid-December, the weather looks great for those days. No lows or fronts nearby. Great time to go flying. Just don't count on it.

Another good place to have a look ahead is at weather.gov. Here you can type in the name of any city and get a general weather forecast for the coming time. The really good stuff is found when you click on "forecast discussion." These are the individual forecasters telling you what those general forecasts are based on. Some go to great lengths, some are rather terse. These are the same forecasters who prepare terminal forecasts for the area in question.

The forecast discussion I most often use, from Sterling, Virginia, has always been excellent and informative. It lets you into the mind of the forecaster.

This starts with a short-term forecast, for the 24 hours following the time the forecast is made. This discusses the features expected and the resulting weather.

Sterling next discusses short-term aviation weather. I'll quote one: "Broad area of low to mid clouds ... on average BKN-OVC 050 ... will continue to move east across the northern terminals through the late morning. These will break apart later this afternoon. VFR conditions through

00Z Friday." Isn't that a concise statement of what's going on?

The next part of the product is the long-term discussion, covering tomorrow and beyond. This becomes very general and filled with caveats. They might put a cartoon-like symbol on a forecast for the days ahead, but when you read the discussion you can be convinced that tomorrow and beyond is likely open to some question, especially if a weather system is expected.

The one I was looking at as I wrote this covered a potential snowstorm on Thursday and it did a good job of calling the system. But there were qualifiers all the way through. Try this: "Complex double low storm will likely bring snow to the region late Thursday into Friday. Amounts and possible freezing rain or sleet mixing will depend on how the two lows interact with one another."

In the discussions they often cite the difficulty of going forward, and they make frequent mention of the atmospheric models that are used to project the movement of weather systems. More often than not, the models don't agree with each other.

So that is my look at weather out a few days, trying to anticipate what might happen. If trying to decide what time I'll have to leave to arrive at a certain time, the winds aloft out a few days are on the ADDS site, adds.aviationweather.noaa.gov along with some other things that will be covered shortly. On Friday, the site has wind aloft forecasts through early Monday, for example. I have found these forecasts to be fairly accurate even at the farthest out times.

Does that advance study of weather help manage the risks found in weather flying? I think it does, if for no reason

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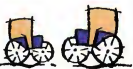


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other than the thought processes it generates in relation to weather.

The next briefing is the one before the flight. The study leading up to this can give a good due to what is important and what is not.

I use a DUAT briefing when leaving from home and select the standard briefing. It doesn't take long to download, usually a minute on dial-up, and while there is a lot of stuff there you don't need, there is also a lot of good stuff. Notams have become ever more important. They are unrelated to weather but a record is kept of the briefing and could be a CYA item if something happened.

I do three things with this DUAT briefing. I use it to examine conditions along the proposed route of flight, especially in relation to the synopsis, or the highs, lows, troughs and fronts. I use it to see if there needs to be serious consideration of an alternate plan or route. And I use it to see if I need more information.

If thunderstorms are in the terminal or area forecasts, that means radar study. If there is an airmet for ice, that prompts a look at the ADDS icing site, address previously given. If there is an airmet for turbulence, that requires some thought about what is causing the turbulence. Any sigmets require careful study.

Weather briefings not from home are obtained from an FSS. They are not as thorough as DUAT briefings, but they are good because the briefer has been watching the weather and should know what is going on.

Would a pilot not obtaining a briefing be at a disadvantage while managing the risk of a flight? I definitely think so if there is any question about the flying weather. While a briefing is all either history or educated guesses, to launch without knowledge of what has been going on and what is expected to go on would be risky. As far as improving weather briefings, per the NTSB's suggestion, I don't think that is possible from a practical standpoint. What we *can* get now is so thorough that it's hard to imagine any more.

Some in the FAA used to talk about "a legal briefing." No such thing ever existed. The rules say the pilot must examine "all available information," which is pretty broad. The rules mention weather, too, but they do not define a weather briefing. That leaves it pretty much up to us.

When *The Weather Channel* first came on the air some Flight Service Stations experienced a decrease in business. Cer-

tainly if you look out the window and it is clear, and *The Weather Channel* says it is going to be clear and doesn't mention breezy or windy, then you know things are probably going to be okay. Is that enough of a briefing for a local flight on a clear day? Probably so.

Now we get to the most important weather briefing of all, the one that begins at takeoff and continues to the end of the flight. This one is not often mentioned but is critical in managing risk. And it has become many times easier with the uplink/downlink of weather information.

First, an anecdote. Mac was headed west from White Plains and postponed the trip because of an area of weather out in Missouri. I said, not totally in jest, that either one of us would have started out on that trip 20 years ago, to see if we could work through the weather.

That brings us to an important element in weather flying. We make a decision to start out, based on there being no immediate hazard. Then, once en route, we make the decision to continue, again based on no immediate hazard. When something bad gets close, say within 100 miles, then, based on knowledge of conditions, the decision has to be made to divert, or land, or do anything other than continue toward the hazard.

In this case, the information has to be complete, from uplink/downlink or other sources. And this is where a person, who is not interested in learning all he can about weather, is at a disadvantage. This is where only the weather-wise pilot can tell the difference between the possible and the impossible.

In accident reports we see a lot of cases where the pilot started out in okay conditions and continued on into stuff that he couldn't handle. The information was there, the pilot just didn't use it.

Accident reports tell a lot of other tales about weather. In many cases the event had more to do with poor flying or risk taking beyond what works. When a pilot descends into the ground away from an airport, no amount of weather education or briefing is going to help. The same is true when a pilot loses control of the airplane while flying in clouds.

It is true that a lot of accidents happen in bad weather and it is also true that weather-related accidents are quite serious most of the time. The solution, as is true in most things related to flying, lies with the individual. ✈

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BY ROBERT GOYER

Making the Leap From Pistons to Jets

**Can an average pilot with average skills
make the transition from the flatlands to the flight levels?**

We do the flying and find out.

WITH THE COMING AGE OF VERY LIGHT JETS (OR WHATEVER you want to call them) just around the corner, the question has been repeatedly raised but never really answered: How will pilots fare when transitioning from piston-powered airplanes to this new breed of little jets?

It's a much more complicated question than it at first appears, so to come up with an answer, or at least to understand the question much better, we decided to conduct an experiment. Instead of wildly speculating (as much fun as that can be), we decided to take a typical very light jet pilot candidate and go out and do some actual flying.

As luck would have it, I was the guinea pig for this assignment. In terms of my aviation experience and habits, I'm exactly the kind of pilot that safety experts have in mind when they worriedly bring up the issue of newbies flying VLJs into the flight levels. I'm a 1,200-hour non-multi-engine rated pilot who has quite a few hours in the latest high-performance technologically advanced singles. And my typical mission profile is strikingly similar to this new breed of pilots who will be transitioning en masse to VLJs, in that I fly almost solely for transportation, I file IFR on just about every trip, and I'm not only comfortable with new technology, I actively embrace it.

Like a lot of our readers, I've also been dreaming about flying jets since I was a kid.

Using me as the test subject, the specific question we looked to answer was this: *Can a regular piston-single type pilot who flies IFR in the system and is reasonably proficient on instruments transition to jets?* We'd find out.

Of course, there aren't any VLJs yet. So we did the next best thing (actually, it wound up being even better than that) by

picking a jet that emphasizes all of the challenges pilots will find when transitioning to turboprops.

To conduct the test, we got together with John and Martha King, owners of King Schools and operators of a Falcon 10 business jet. At first blush, the Falcon 10 may seem like exactly the wrong jet for our purposes. Unlike VLJs, the Falcon 10 is very fast (.87 Mach), plus it weighs around three times as much as most of the VLJs (nearly 20,000 pounds full of fuel and people). And with its sweptback wings and leading edge slats, it has more in common aerodynamically with a Boeing 747 than with an Eclipse 500. But it's precisely because of these big-jet characteristics that the 10 is a perfect candidate for the job. If there's a challenge in flying jets, it's to be found in the Falcon 10.

Before we got started, I spoke with John and Martha about the program, and we formulated what sounded like a reasonable plan. Before arriving in their hometown of San Diego, I'd prepare by studying up on the Falcon 10—I used SimuFlite's excellent flight manual for the airplane—and by going through a trio of online courses taught by King Schools: Jet Transition; High Altitude Flight; and Reduced Vertical Separation Minimums (RVSM). Then once I was in California, we'd spend an afternoon going over systems and getting to know the actual airplane before going flying the next day.

The modest goal of the flying, as John King defined it, was to get to the point where I felt I would be able to "fly a jet comfortably with further training." I took that to mean, getting to the point that I would no longer be completely demoralized by the experience.

Now, to be fair, I had a bit of a head start on my jet training. I've had the chance on a couple of occasions to fly in Level D jet

John and Martha King: Pilots and Teachers

To say that the Kings are an unusual aviation couple is an understatement. They founded, own and operate King Schools, a business that produces aviation educational materials designed to do just two things: Help pilots pass their FAA knowledge tests and make us all safer fliers. Over the past 30 years, tens of thousands of pilots have used the Kings' products, and the school has developed courses of study for Cessna, the FAA, and even Microsoft.

But purely in piloting terms, the

Kings' achievements are just as remarkable. Both John and Martha have every aircraft pilot certificate—they each recently added their powered parachute tickets—they're active instructors, and they regularly and enthusiastically tackle new challenges. Last year they flew their Falcon around the world.

When it comes to jets, they're not just remarkable; they're likely one of a kind. As far as we know, they're the only married couple who crews their own bizjet, swapping turns in the left and right seats.

For years, the Kings flew a Citation 500, and a few years back when they decided to look for a new challenge, they gravitated to the Falcon 10, an airplane that offers up tremendous speed while requiring top-notch piloting skills, thanks to its big-airplane systems and flying characteristics.

As far as VLJs are concerned, the Kings, though they love the concept, aren't in the market. They're pretty happy with .87 Mach and a 1,500-nm range, figures you won't find in anything that incorporates the word "light."



■ Martha and John King preparing to take off from Montgomery Field in their Falcon 10.

simulators, so the jet experience wasn't completely foreign to me. I knew the feeling of handling the controls and watching the displays. But on those occasions, I was never doing any official training, and the instructor/pilots were always very helpful with the visiting journalist, so my official duties in the "cockpit" were limited. The instructor could even control the weather. The game plan with the Kings was to fly in a real jet in the real world.

Getting Ready

Before I left for San Diego, I cracked open the flight manual. It wasn't an in-depth course of study by any stretch, but I wanted to familiarize myself with the basic systems and operation of the Falcon 10 so the airplane wouldn't be a complete mystery to me when I arrived. I spent about a day going over the systems and the standard and emergency operating procedures. It would wind up being a big help.

There are a lot of things about jets that pilots who fly piston-powered airplanes never learn simply because their world doesn't involve those things. When climbing through 18,000 feet, for in-

stance, you change over from the local altimeter setting to a standard setting, 29.92, or vice versa when descending back through 18,000 feet, not something I ever need to worry about in my Cherokee Six. Neither do I worry my pretty little head about when to change over from reading my indicated airspeed in knots to reading it in Mach speed. It's just not an issue for me.

But these types of things are part of the fabric of daily operations when you fly jets, and inattention to them is a bad thing.

Luckily, the Kings' Jet Transition course is designed with pilots like me in mind. The course, which took me about four hours to complete, covers all of the big background questions about jets: Why do they fly so high? What's up with turbine engines? Are all jets alike? What's the guaranteed takeoff performance in jets? and Who does what in a crewed cockpit (one that has both a pilot and a copilot)? A lot of these questions might sound silly to those already well versed in jets, but that's precisely the point. The big, overview questions are exactly what pilots looking to transition never get answered. In traditional courses, that kind of information just kind of filters down through the noise of the details. Not so with the Kings' Jet Transition Course, which tackles those questions head on. "It's designed to teach things an experienced good friend would tell you to make the transition to jets easier," said John, who explained that neither he nor Martha had the advantage of such a course when they made the leap to jets years ago. Like everybody else, they had to figure things out on the fly.

Over the weekend before my trip to the Kings' I also completed the two other ground courses, RVSM certification (which took about an hour to complete) and the High Altitude Endorsement Ground Training course (about three hours). In keeping with my theme of thinking I knew more about jets than I really did, both courses were eye-openers for me, answering questions that I'd had for years about such topics and bringing up subjects I'd never previously considered.

As it would turn out, the three courses were invaluable preparation in my quest to transition to jets, because they kept me from asking all of those questions once it was time to get into the airplane, where, I'd soon learn, there would be more than enough to do.

Nerves

As I was preparing for the course, I developed a real case of nerves, and it was mostly because of the tiller.

A tiller is a small ground steering wheel located on the left side of the captain's seat (the left seat), and I'd discovered in my going over the flight manual that the Falcon has one. There's just one, so if you're in the left seat, it's all on you. The tiller setup varies from airplane to airplane. In the Falcon 10, you use the tiller to taxi the airplane and also on the takeoff roll until you get up to 80 knots. Up until that point, the captain doesn't even have the yoke in his hand—the right hand is on the throttle and the left hand is on the tiller—so there you are, hurtling down the runway controlling the airplane with a notoriously sensitive little dial on the sidewall. The good news: At 80 knots, you move your hand from the tiller to the yoke, and things go back to normal again for a few fleeting seconds before you rotate. (The better news: None of the new VLJs have a tiller.)

My case of jitters wasn't helped by the story John told me about how he and Martha volunteered to help out a Falcon 10 sim instructor who needed to get some time in the real airplane. On his first few attempts, he was all over the runway trying to keep things under control. Great, I thought. If the sim instructor can't control the thing, what chance did I have?

The afternoon before we were to go flying, John and I went out to pay a get-to-know-you visit with the jet. We started our orientation with a walk-around, paying special attention to the things that make jets different from piston airplanes. We looked at the sweepback of the wing, the leading edge slats, of course the engines, the tail with its trimmable stabilizer, and the heated windshield, to name just a few of the very different kinds of components you find on jets.

Then we boarded the airplane. There are stories, probably not apocryphal, of sim-trained jet pilots getting to the airplane and not knowing how to open the

door, the sim, of course, not having a door. We climbed into the cockpit to get acclimated. The Falcon, like every jet of its era, has a host of knobs, switches, buttons, lights, warning horns, levers, dials, breakers, gauges and displays. Although the Falcon's panel is more intuitively laid out than most, there's still a lot to get to know, let alone master. To familiarize me with the panel (and subpanels, and overhead panels), we simply ran the checklist.

It took us an hour and a half.

Granted, much of the time was spent with John explaining things to me, like the logic of the hydraulic checks (please, no pop quiz on this one), so going through the checklist in real life would take much less time. That said, it can still take a well-trained crew of two 20 minutes to run the first check of the day. A cursory walk-around the airplane and a quick CIGARS check heading out to the runway? It's not a good plan when it comes to jets. There are simply too many things to check. In fact, I came to realize that is one of the primary things that differentiates jets from the light stuff, the overall complexity of the flying chore and the commitment to professionalism required of the crew (even if you're a crew of one).

What are the big differences between jets and light airplanes?

Speed. Well, duh, speed is what jets are all about, but there's more to it than meets the eye. Speed imposes lots of new challenges on pilots not used to it. When you're flying faster, there's less time available to perform every pilot task, as well as less time to adjust to new clearances, to make changes in plans and to prepare for arrival, just to name a few speed-related challenges.

Complexity. The systems in a jet require a completely new level of understanding of the machine that you're flying. The engines, turbofans, are completely different from the piston engines in the airplanes we fly. And then there's pressurization, bleed air, sophisticated hydraulics, anti-ice, anti-skid, flight management systems, flight directors, and more, all of which require the pilot to know the airplane.

Aerodynamics. Because of their high wing-loading, jets behave differently in the air than any airplane you've ever flown before. They take off differently, stall differently, approach differently, and land differently. It's a whole new set of pilot skills you need to master to make the transition to jets.

Altitude. At low altitude, jets fly fine in the cruise and climb phases, but up in the 30s and 40s, they're very sensitive because there's not much air blowing over the surfaces. And as you approach the airplane's top speed, you need to tread with care, as the loss of control, either getting the airplane too fast or too slow, is a real issue if you stray outside the certified performance envelope.

Attitude. When you fly in jets, there's no time to fool around. From preflight to touchdown, you've got to be all business, and you need to use your time judiciously. Enjoying the view? Don't spend too long. There's always something to be done, whether it's running a checklist, performing a descent calculation, monitoring the engines and other systems or getting the weather at the destination. A busy cockpit is a happy cockpit.

Getting Airborne

After breakfast the next day we went flying. The plan was for Martha, who was acting as captain, and John, who was flying as first officer, to fly the first leg, from San Diego's Montgomery Field to Blythe, near the California/Arizona border, where I would take over, eventually flying us all the way back to my home airport in Austin, Texas, a thousand miles away. There were two compelling reasons for Martha and John to fly the first leg. First, it would give me a chance to observe the process from the side-facing seat right behind the cockpit, and because the airspace around San Diego is extremely busy, and I wouldn't need additional challenges.

If you've ever watched a professional flight crew in action in a high workload environment, you know it's an impressive sight. Sitting in the jump seat going out of Montgomery Field (elevation 427, runway length 4,600 available for takeoff, 3,400 for landing), I watched with special interest since it was going to be me in the left seat on the next leg of our flight. What interested me most was the dance of hands that transpired on the takeoff roll, with Martha advancing the throttles,

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steering via the tiller as we accelerated like a rocket down the runway.

John as copilot made the callouts: "80 knots."

Martha's hand came off the tiller and she called out, "My yoke."

"Vi," John called out at 107 knots. Martha's hand came off the throttles and took the yoke in two hands.

"Rotate," John chimed in as we reached 114 knots, and Martha briskly rotated the Falcon to 16 degrees nose up.

"Positive rate," John chimed in.

"Gear up," commanded Martha. John raised the big red lever, and the 10 left Montgomery Field far below as it rocketed upward at 4,000 fpm. And the enthralling performance continued.

Just watching Martha and John working together was a real education in what it takes to fly jets. Compared with flying my Six, the SR22 or any other single I've ever flown, the differences are dramatic. With jet speeds, time itself is compressed. You simply don't have 10 or 15 seconds to think about things before you do them; you've got to respond, like right now. If you don't, you can bust the 200-knot speed limit in the Class D or the 250-knot limit below 10,000 feet, or worse, much worse. Also, the teamwork needed to fly a crewed jet is something that can only be accomplished through rigorous and regular training. While this kind of teamwork won't necessarily be required in VLJs, all of which (to our knowledge) will be authorized for single-pilot operation, all or nearly all of the steps it takes to fly the Falcon will need to be performed by the single pilot of any VLJ. Those pilots will be kept very busy, to be sure.

After landing in quiet Blythe (CA), Martha and I switched seats. I'll spare you the amusing details of my trying to master the tiller steering, but suffice it to say that by the time I'd repositioned the airplane to the takeoff end of the runway John felt confident in my ability to keep the jet rolling relatively straight on takeoff. That made one of us.

My first takeoff was no work of art. As best as I remember—for some reason I wasn't taking notes at the time—John had to remind me to take my hand off the tiller and he had to physically move my hand off the throttle at Vi. I did rotate to the recommended 16-degree climb attitude (a horrifyingly big number to those of us who fly light singles), but I was late in getting the power back to 90 percent N1 and I promptly blasted



Falcon 10:VLJ? Not by a long shot.

The airplane I flew for this story, the Dassault Falcon 10, isn't a Very Light Jet, not even close. The airplane was developed in the 1970s to compete with Learjets at the then-low end of the market. More expensive to own and to maintain, the Falcon 10 (and later the avionics-upgraded Falcon 100) couldn't compete with the Lear in the marketplace, even though the French airplane was faster and had better handling qualities. Only about 250 10/100s were built. Of those, about 180 are flying in the United States today.

While it's the smallest Falcon, it's not a small airplane. The Falcon 10 weighs more than 19,300 pounds fully loaded, and its MMO (max mach operating speed) of .87 Mach made it about the fastest bizjet in the sky until the Citation X came along a few years ago.

The 10 requires a crew of two, as opposed to most VLJs, which will be single-pilot capable. Equipment wise, the Falcon has a lot of big-airplane equipment, including leading edge slats, airbrakes, bleed air de-icing, hydraulic controls with artificial feel, anti-lock brakes, and a tiller for steering the airplane on the ground.

What it does have in common with VLJs is that it's a personal-sized bizjet that's flown alongside airliners in the high-20s through the 30s.

If you're up for the flying challenges, and the maintenance costs, a nicely equipped used Falcon 10 can be had for between \$1 and \$2 million, less than the projected cost of most VLJs.



through the pattern altitude at Blythe.

Two more big differences: As I mentioned, you set power in a jet by reference to N1, or fan speed. Different jets have different engine control systems, and the Falcon has a kind of fadec-lite that makes management much easier. Most VLJs will have fully automated power controls.

Also, and probably more importantly, I quickly learned that flying a jet is not an out-the-window experience. In order to fly with the precision required to keep the slippery airframe where you want and at the proper speed, you pretty much need to be on the gauges full time. The concept of see-and-avoid is tough to reconcile with single-pilot operations in jets. So pilots looking to transition who aren't comfortable flying by the numbers will be in for a challenge.

Another big challenge facing piston pilots looking to make the leap is the flight director. I have to admit that I never truly understood the need for the instrument until I flew in the Falcon. In order to fly with any semblance of precision, you need to constantly monitor the changing state of the flight path. Unlike in a slow and draggy piston airplane, doing that by hand and eye alone is nearly impossible. The flight director, which can respond more quickly than the human eye to trend changes, makes precision flying possible.

The aerodynamic challenges to the transitioning pilot are found in two dramatically different phases of flight: landing and cruise.

John and Martha had separately warned me that one area where would-be jet pilots frequently stumble is making good approaches and landings. The prob-

lem is, the way our piston airplanes, and their engines, operate is fundamentally different than the way jets do. Because they're intended to go fast, jets have highly-loaded wings. (Sweptback wings, like on the Falcon, present new issues altogether, though since the VLJs are straight-winged craft, I won't go into the details here.) Get slow on final in a jet and two big problems present themselves. A heavy, draggy airplane that gets too slow will sink like a stone. Of course, the best way to counteract that tendency is to not let it happen in the first place, which means keeping a close eye on your reference speed (calculated for each new landing) and simply not letting it happen. The problem is, if you do start to sink when the engines are already at flight idle, you might have to wait a while—John says it can be as long as eight seconds in the Falcon—after increasing power for the engines to spool up. Until they do, all you can do is wait.

Also, as you approach in a jet, you're going a good deal faster than you are in a piston single (though some of the VLJs will come over the fence at piston twin speed). The technique is to closely monitor the instruments, especially airspeed and VSI, before transitioning to a visual landing after the runway is made. It's very much like an instrument approach on every landing. The result is a very different view of the runway, leading most transitioning pilots to flare too high, something I was certain I would fall victim to but didn't, probably because of the wisdom imparted by the Kings in the Jet Transition Course I'd just completed a few days prior.

Based in part on my own experiences, I

think that making stabilized approaches will be a difficult, and potentially riskier, skill for transitioning pilots to develop, while learning to land consistently will be an easier task to master, as long as the pilot's speed control is good. Helping matters is the fact that, unlike piston-powered airplanes, most jets approach in a slightly nose-up, landing-ready attitude, and once they're ready to touch down, they normally do so without much float.

High altitude also presents challenges and poses risks in terms of oxygen, or the lack thereof, to be more precise. Dealing with pressurization is a surprisingly straightforward thing, though tremendous care needs to be taken in the pre-flight phase to avoid unexpected surprises of the worst kind. As part of my high altitude endorsement training, we conducted a simulated emergency descent, the kind you'd make in case of a real depressurization. The good news is, these airplanes can get down to breathable altitudes in a hurry. The bad news: At 40,000 feet, you might have just 10 seconds of consciousness before you get your oxygen mask on. Intimate knowledge of emergency procedures—there's no time to use the checklist—is the only thing that will keep you and your passengers alive in such an instance.

After our simulated emergency descent, we landed at Las Cruces, New Mexico and had a bite to eat at the great little airport restaurant before climbing back into the 10 and heading on to Austin. The last leg went smoothly, and before you know it, we were a couple hundred miles out and ready to descend.

And there was another big difference between jets and light airplanes. With 280 miles left to go in an SR22, let's say, I'd be checking what was on XM radio to wile away the time. In the Falcon 10 (admittedly a faster airplane than any VLJ), we had a half-hour to start down, make our 10,000-foot crossing altitude at Llano and begin the arrival. In a jet, you simply need to prepare ahead of time, and careful descent management is critical in order to keep from being either too high when you arrive or low too soon, which wastes valuable fuel.

The controller vectored us over the city of Austin and then towards a long left base for Runway 35R. We had the ILS dialed in, and as I hand-flew the approach I couldn't help but feel a touch of pride in arriving at my home airport in such high style, and with me flying nonetheless.

VLJ Features That will Make the Pilot's Job Easier

Certified in the early 1970s, the Falcon 10 is an old-school bizjet in most regards. The new crop of VLJs, which will include the Eclipse 500, the Cessna Mustang, the Adam A700, and the Embraer Phenom 100, will boast a number of equipment upgrades and design strategies intended to make the pilot's job easier.

FADEC: Full authority digital engine control. With "set it and forget it" engine controls, the workload is greatly reduced, especially important for single pilot operations.

Flat panel displays: LCD primary flight displays give the pilot a lot of information in one place on the panel, and big bright MFDs are a clearinghouse for all kinds of useful safety-of-flight information, from systems status to weather data link.

User friendly FMSes: The flight management systems in many of the new VLJs will be as easy to use as your Garmin 530, so learning the mysteries of dedicated FMS boxes, once considered the hardest part of getting a type rating, won't be as intimidating as it used to be.

Integrated engine and systems monitoring: With all of the airplane's systems integrated, talking with each other and being displayed on one or two LCDs, the pilot will, at least in theory, have a much easier job of monitoring and troubleshooting systems problems.

Simplified aerodynamics: With their mostly straight wings and relatively thick airfoils, VLJs won't be the fastest jets in the sky by any stretch, but they'll behave better than swept-wing jets at approach and landing speeds.

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BY JOHN KING

Looking Ahead

At dinner that night John and Martha and I discussed the experience and what we'd learned from it.

The big question we began with was, "Can a regular piston-single type pilot who flies IFR in the system and is reasonably proficient on instruments transition to jets?" The answer was, "Yes." I had some real advantages, to be sure, including a pair of excellent instructors who had gone through the same process as I was starting out on and who had come back with some good advice on how to make the transition work.

But I also came away with a strong conviction that this transition isn't for every pilot. It's not even for every pilot who wants to and can afford to make the jump. Flying in the flight levels requires a serious commitment of time and energy. You've got to know the airplane inside and out, backwards and forwards, and you've got to spend the time learning to fly it well, and that commitment doesn't end with a type rating. You've got to train regularly in order to keep flying it well.

While jets in general provide a tremendous amount of reserve performance compared with piston singles and twins, and a great deal of redundancy, their margins of safety can be small. Moreover, they require precise and consistent performance to get that added safety out of them. I learned firsthand that the rewards of flying a jet—speed, altitude and safety—are tremendous things, but so are the challenges. For those pilots who are up to the task, who are willing to put in the time and the effort to hone their skills and know their platform, the thrill of a lifetime awaits. ✈

Jet Transition From the Instructor's Viewpoint

Robert dramatically demonstrated that a good instrument pilot, well prepared, can transition into a jet smoothly and learn very rapidly. Working with Robert in his transition to a jet in our Falcon 10 was one of the most rewarding flight instructing experiences I have ever had.

A flight instructor has the privilege of sharing very special life-defining events with students. I knew for sure that Robert would remember this day in vivid detail for the rest of his life. He will never forget how his right hand controlled those jet engines with the unfamiliar whine coming from behind instead of in front, and the great, smooth surge of power delivered like magic with no propeller in sight.

The day was a resounding success in most part because Robert was the perfect student. He is a current, highly competent pilot and very proficient on instruments. Plus, he was splendidly prepared. He had thoroughly studied the material on the systems of the aircraft that I had sent him, and had taken our online jet transition course designed to pass along all the practical tips that Martha and I would want to share with a good friend transitioning into jets for the first time.

Robert's training with me began the night before in the cockpit of the airplane while on the ground. We spent a couple of hours using the cockpit as a procedures trainer and going over all of the controls. By the time we were done, he had the checklists down for each phase of flight.

Robert's first flight in the airplane was as an observer while Martha as captain and I as copilot demonstrated what a normal flight should look like. This gave Robert the opportunity to observe the pitch attitudes and power settings. It also gave us the opportunity to re-position the aircraft to Blythe, California, where we would have less busy airspace and more room to maneuver.

At Blythe Martha moved out of the captain's seat and Robert moved in. Martha sat behind us to make sure we stayed out of trouble.

We chose Blythe because I wanted Robert to do his first trip around the pattern at a place where altitude control was not critically important. I had ob-

served in the past that pilots not used to the climb performance of a jet have a hard time leveling off at the target altitude on the first takeoff. Plus, there is a tendency to be a little intimidated by flying a jet, and it makes pilots reluctant to be aggressive about controlling the airplane. Robert was no exception. We overshot our pattern altitude by 600 or 700 feet.

Pilots new to a jet also have difficulty with the pitch and roll sensitivity, and Robert demonstrated that by altitude excursions of plus or minus 300 feet and wing rocking on downwind. All of this is just part of the process of getting calibrated to a more sensitive airplane. At first you just don't know how much control pressure to use.

The amazing thing is that by the time we turned base, Robert had the control pressures figured out and we were steady on altitude and heading.

It was on final that Robert's preparation and skill as a pilot came into play. Most new jet pilots have a very hard time with speed and altitude control on final because without propellers you don't get the blast of air over the wings when you increase power. In a jet, to get more air over the wings, you have to accelerate the whole airplane. Also, with props, when you need to slow down, the propellers will turn into great big air-brakes. Jet engines, on the other hand, continue to provide residual thrust even at idle.

So I was expecting to see Robert have the normal speed excursions that everyone else has. He didn't. I had told him that in landing configuration in the Falcon he would need a slight nose-up pitch attitude and a power setting of about 68 percent of fan speed, and to make minor adjustments as needed. Robert dialed those in and we went down final like we were on a rail. I think the online jet transition course might have helped him out on this, or it may be that he is just a naturally smooth pilot.

Also, I had told Robert that he really had only three things to worry about—heading, altitude, and airspeed. If he did a good job of those, I, as his copilot, would take care of everything else, and he would do just fine. Well, he did just fine.

On the landing new jet pilots tend to get a speed rush and flare too high. Not only that, but the proper landing technique for a piston airplane of holding the airplane off until it touches in a near stall attitude just won't work in a jet. The residual thrust of a jet and the clean aerodynamic design would mean you could float the whole length of the runway. The proper technique for a jet is to arrest the descent, hold the pitch attitude, and let it touch.

I was expecting Robert to follow the piston-pilot pattern and instructed him to not flare until I told him to arrest the descent. I overcompensated for the normal tendency to flare too soon and was too late in telling Robert to arrest the descent. He did exactly what I told him to do and we got a little skip on the first landing. On every landing after that I kept my mouth shut and he got progressively better and better until on the last landing the wheels just started rolling. I was still asking him if we had touched down yet as he taxied off the runway.

After three trips in the pattern at Blythe, we picked up our IFR flight plan to Las Cruces, NM. Robert was in complete and smooth control. While the airplane was on autopilot at altitude, we briefed the arrival into Las Cruces and the ILS approach. Also, we were going to do a simulated rapid decompression and emergency descent into Las Cruces so Robert could get his high altitude endorsement, and we briefed those too.

The emergency descent follows a checklist that requires the crew to put on oxygen masks, re-establish communications with each other, bring the throttles to idle, deploy airbrakes, roll into a forty-five degree bank, and pitch down to red-

line airspeed. The result is you are staring at the ground while descending at better than 8,000 feet per minute. It is a very impressive view out the front window. The first time, everybody has trouble keeping the nose down enough to get redline airspeed. Robert came down at a speed a little short of redline, but not bad for the first time, and well within the acceptable range.

After lunch, the next leg was from Las Cruces to Austin, Texas. Robert flew the leg flawlessly, including the ILS into Austin. I told Robert that Martha and I would be comfortable hiring him as a copilot at the skill level he displayed. But Martha said that she already has a copilot and doesn't need another.

Is it clear that Robert can fly a jet? You bet. In one day of flying he developed the basic control of the aircraft required of a jet pilot. Is he ready to be pilot-in-command? Not yet, but he's not far off. We kept his workload down so that he could concentrate on basic control. The next phase of his training would be to give him more complexity to deal with by having him fly in more dense airspace and giving him some systems problems to solve. But he is ready for that challenge.

How will the pilots transitioning to very light jets do? If they are as well prepared as Robert, probably just as well as he did. The greatest concern a lot of folks have is the question of whether there will be a jump in the turbine accident rate when we get this crop of new turbine pilots. In my view there probably will be, but these new pilots will probably be safer than they would have been in piston twins—just not as safe as the current turbine fleet.

I don't think the problem will be basic aircraft control. Robert demonstrated that piston pilots can transition to a jet very quickly and do a fine job of controlling it. The problem is that these new pilots are likely to come into turbine aircraft with a different mind-set than the current professional turbine pilot. These folks will often be entrepreneurs with a desire to prove how capable they and their airplanes are. They will face a new set of risks without the seasoning afforded most turbine pilots by years spent as a copilot.

We need to figure out how to make these new jet pilots aware that especially in a jet their number one priority is risk management, and give them the tools to manage those new risks.



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Brian Grote is a flight instructor with 20 years aviation experience. He also writes monthly columns on subjects pertaining to aviation.

Dear Brian,

I've been flying for over 20 years. My usual run is a Denver departure at 9pm, fly to Billings, on to Cheyenne and then back to Denver by 5am. I fly a King Air 350. I love my career and I pride myself on doing the best job I possibly can.

Last time out, however, I was making lots of little mistakes. I was cleared for the ILS Runway 35R into Denver, but I couldn't pick up ATIS. That's when I looked at my radios and noticed I had dialed in the wrong frequency. I glanced again and dialed in the right frequency. I continued through my checklist and set my Ground Proximity Warning System to 5500 feet. I was ready to make my descent and start my approach. After the outer marker I glanced at my DH again and noticed that I had set my GPWS 67 feet low. Luckily, I landed safely, bouncing the wheels just a little.

After a couple more days in the sky I could tell my eyesight was beginning to deteriorate. I knew I wouldn't be able to renew my first class medical if I didn't do anything about it. I was really worried and started asking my peers if there was anything I could do.

A co-worker gave me a bottle of **ClaroXan™** and told me it would help me maintain my depth perception. I was skeptical at first, but tried it anyway. As it turns out, the stuff works great. The problem is, I ran out and don't know where to find more. Have you heard of this ClaroXan stuff? Is it available in the states?

Jason, 46 - Seattle, WA

Jason,

Not only do I know of **ClaroXan**, it just so happens I take it every day. Being a pilot myself, I know that perfect visual acuity is an asset none of us can afford to lose. That's why every pilot should be protecting their eyesight before it's too late.

ClaroXan contains ingredients proven beneficial for the eyes. Among these ingredients are lutein and zeaxanthin — powerful antioxidants that have been clinically proven to protect the retina and macula and, in some cases, reverse the damaging effects of macular degeneration. These antioxidants block damaging UV rays and halt damaging free radical oxidation in the back of the eyes. They have also been clinically proven to decrease the risk of cataracts.

ClaroXan also contains bilberry, an antioxidant known to improve night vision. Bilberry's night vision enhancing effects were first noticed in England in the early 1940's. The RAF ordered English fighter pilots to eat bilberry jam on toast figuring it would give them an advantage during night raid missions against the German Luftwaffe fighters.

ClaroXan's unique proprietary formulation is completely safe, all natural and extremely affordable. As far as ordering it, you can call them toll free at 866-651-EYES, or go to www.claroxan.com. I usually get mine within a week after ordering.

Hope this helps!

Brian



Jumpseat

By Les Abend



Somebody Else's Airplane

SOMETIMES THE FUN INVOLVED WITH my job is not the work itself, but getting there. Where most professions involve a car, a train, or a bus, I can use somebody else's airplane. I have chosen to live in Florida, away from my New York crew base in the winter. I do this for only one reason: It's cold. And no, I don't consider myself a snowbird. My wife is the snowbird. I just follow her.

The airline vernacular for what I do gives me the label of "commuter." Sometimes it can be an ugly word.

Being a commuter means that one subjects oneself to more time away from home. Being a commuter means that one sleeps in one too many hotels, one too many "crash pads," or one too many well-worn recliners. Being a commuter means that showing up for work on time

is a carefully planned chess game of juggling drive times and flight schedules. Being a commuter means accepting the last middle seat in coach. Being a commuter means not even breaking a sweat when the gate agent announces the cancellation of your primary flight to work and your back-up flight is already overbooked. Being a commuter means accepting a three-hour ride on a Super 80 jumpseat that is more conducive to disc replacement than comfort. Being a commuter is having the nerves of steel to be able to turn the page of your magazine even when the captain announces a one-hour mechanical delay at the gate, and your sign-in time is the new ETA. The bottom line: Being a commuter is not for the squeamish.

Because a high percentage of the air-

line industry is down-sizing, many of my colleagues commute out of necessity. They would rather accept the inconveniences of commuting rather than accept a substantial pay cut. The pay cut would come as a result of a junior pilot being displaced from the left seat to the right seat or from a higher hourly rate on one airplane to a lower hourly rate on another airplane. Uprooting families from an established home is also a hardship, especially if the displacement may only be temporary. With real estate prices increasing and airline incomes decreasing, moving may not be financially feasible.

In my case, I have no excuse. When it comes to commuting, I have done it out of my own free will. Nonetheless, I have a commuting horror story that will give the uninitiated insight and the initiated a brief moment of reflection.

For the month of November, my schedule was my usual two-day trip: One leg from JFK to LAX on the first day, and then back to JFK on the second day. The trip left New York at 1600, which meant a sign-in time of 1500. I was scheduled to return to JFK on the second day at approximately 1615.

I chose this trip because it is what we call in the business, "commutable on both ends." In other words, I can get to work on the same day the trip begins and get home the same day the trip ends; well ... in this case, sort of. The front end of the trip is no problem. I use our regional carrier at my home airport, and then connect with my airline in Miami for the flight up to JFK. But on the back end of the trip, I miss the last flight out of Miami to my home airport.

Prior to this writing, my wife and I had only one car between us. Since I had no transportation in Miami, that meant



Jumpseat

renting a car for the two hour and 40-minute drive back home.

My day started with a 4:30 a.m. wake-up call. As usual, Carol shuffled out of bed just after my shower. We left the house at 5:00 and began the 25-minute drive to the airport. As per standard procedure, I pulled my bags from our truck onto the curb while Carol drove around to metered parking. I trotted inside to check that my flight to Miami was on time and that I had a fighting chance of getting a seat.

The airline's station manager recognized my face and gave me a thumbs-up. That was all I needed. I walked back outside to my wife. She sat patient and groggy-eyed in the truck. I kissed her goodbye. She backed out of the parking spot and drove away. Her cell phone would remain on just in case.

Soon after my wife's departure, I boarded the airplane. We were on time. Life was good. And then we reached the hold line at the departure end of the run-

way. That's when my commuting world started to fall apart.

The first officer announced a problem with one of the on-board computers. The airplane was an ATR-72. The closest I have come to flying an ATR is to have sat in the jumpseat. I had barely a clue as to what might be wrong. All I knew was that the connection time to my JFK flight was ticking away and we hadn't even left *terra firma* yet.

I was grateful for one thing, however. I wasn't in uniform. Had I been, I may have been pierced by the frustrated eyes of other passengers. I would have only been able to offer them a shrug of my shoulders and a nebulous explanation.

After 15 minutes of unsuccessful troubleshooting, the cockpit crew taxied us back to the ramp. The passengers and I deplaned. We were given a "decision time" of 0800 to fix the airplane. The actual time was 0730. I knew what that meant. A decision time wasn't definitive enough to get me to work. I had to initiate Plan B. Plan B was to attempt a ride on another regional carrier in order to connect to JFK on a later flight.

I walked at a brisk pace to their ticket counter. But there was only one problem. It was the end of an annual special event at my resort town. The flight was booked full. And the airplane was too small to have an actual jumpseat in the cockpit. It was time for Plan C.

I collected my bags and rushed over to my friend Scott at the rental car counter. I had briefly explained my plight when he passed by as I stood in line at the other regional carrier. Because of the special event, he had a limited amount of cars available, but he would make it work if I needed to get to Miami.

As I approached the counter, Scott smiled. He gestured his head at a customer completing paperwork.

"Hey, Les! Meet Greg. Greg is driving to Miami too."

Scott glanced up from his paperwork and gave me a wary look. He shook my hand.

Scott said, "You guys could split the cost of the car." Greg raised his eyebrows, his face a mixture of curiosity and skepticism. "Les is a friend and a pilot for XX airlines," Scott added.

The last statement seemed to seal the deal. With the agreement that I do the driving, I was on the road to Miami airport with my new best friend, Greg. A little over three hours later, I was at the



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gate of the 1145 flight to JFK with 15 minutes to spare.

As I walked through the forward entry door of the 767, I glanced in the cockpit. I recognized the copilot. He was my friend from our September 11th days spent in an LA hotel. I greeted him and introduced myself to the captain. Like me, both pilots were New York based. They were flying a turnaround. And that was a good thing. It meant that they had started their day very early and were anxious to get home.

I left the cockpit and trotted back into the cabin. I slid into my seat with a sigh of relief. The stress of the morning was starting to melt away. I drew my eyelids closed and grinned. But once again, my comfort was short-lived.

The captain announced a latching problem with the forward cargo door. I had been there before. Depending upon the specifics, I knew that it could take hours or minutes. Good fortune was with me. The problem only took minutes.

Immediately after takeoff I reclined my seatback. Normally, I would nap in our quiet room in JFK Operations. Today, the airplane seat would be my only source of rest before the six-hour trip to LAX.

I arrived in JFK Operations with an easy 15 minutes to spare in order to change into my Batman costume before the 1500 sign-in time. I conveyed a brief synopsis of my adventure to a friend who was a DFW commuter. He could only shake his head and smile.

With only a one-hour mechanical delay of our own, my copilot and I were soon on our way to LA. (What time does the four o'clock flight leave? Answer: It leaves at five.) We arrived at the layover hotel at approximately 2100 PST, or more appropriately, 0000 body time. I know there was at least one of us that was tired.

Because of another minor mechanical delay in LAX, we departed late for JFK the next morning. That meant I would have a limited amount of time to run for the last flight to Miami.

As I found out later, that would be the last of my worries.

The Airbus flight to Miami was not only booked full, but because of an earlier cancellation, it was overbooked. I was destined for one of the two spine-straightening jumpseats in the cockpit. But alas, it was still a seat. And on some days, that's all that counts. The other jumpseat was occupied by a 777 check airman friend of

mine. Since he had just flown in from Tokyo, I deferred the better seat behind the captain to him while I enjoyed the gymnastics of straddling the center console on the other jumpseat.

During the process of our pushback, JFK ground control had managed to taxi two of our airplanes nose-to-nose on the same taxiway. Because New York Port Authority construction activity created taxiway closures that seemed to change hourly, we had limited entry possibilities to our new terminal ramp area. A lengthy delay ensued as the mess was sorted out. The Airbus pilots convinced our pushback crew to maneuver us elsewhere. That solved most of the problem and we were soon rolling along the taxiways destined for Runway 31 Left.

After covering almost half the distance to the runway, the electronic cockpit chime sounded. The first officer reached around my legs for the intercom phone. He put the phone to his ear. His expression turned into an immediate grimace. I knew the look. For one reason or another, I suspected that we were going back to the gate. I was right. A man had become unconscious in the coach cabin. A seizure of some sort was suspected. With the high

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workload involved in expediting a wide-body jet back to the gate, the captain asked for my assistance. I became the communications officer between the flight attendants managing the medical emergency and the cockpit. I was earning my keep.

In a relatively short period of time, we arrived back at our original gate. The afflicted passenger walked off the airplane with his family and the paramedics under his own power. Mission accomplished. The easy part was over. And then the fun began.

We needed to be refueled and we needed a pushback crew. Now that our flight had turned into an off-schedule operation, extra ground personnel were hard to find. Because of cost-cutting measures, our airline was already operating on the lean side of manpower requirements. A lot of radio calls, and a mere hour and 15 minutes later, we began our second pushback. And then it was *déjà vu* all over again.

JFK ground control, along with our ramp control, had found two more air-

planes to duel nose-to-nose. Only this time, the problem required a 777 to be connected to a tug and pushed back to its arrival gate. When order was finally restored, our flight was allowed to retrace its steps back to Runway 31 Left. We lumbered along, taking our place among a sea of blinking red beacon lights, awaiting our turn for takeoff. We had now fallen to the back of a long line of international departures. I shook my head in silence. It was par for the course.

We finally reached our takeoff position after an agonizingly slow taxi and we were on our way to Miami. Upon our arrival, I shuffled off the airplane and looked at my watch. It was 0015. From a not-so-pleasant phone conversation that I had prior to our delayed departure in JFK with the rental car company, I knew that their office would be closed. I tried their local number anyhow. I wasn't surprised to get their voice mail. As a contingency plan, I had made a car reservation with another rental agency. When the shuttle brought me into the vastness of their parking garage, a lone car sat in a marked spot. People with drawn faces dragging bulky bags milled about. I knew I was in trouble. Despite my upgraded membership status with this particular rental car company, I was told no cars were available—at least not until one was returned in the middle of the night. No apologies. That's just the way it was.

Resisting the urge to constrict my hands around the closest neck within my reach, I smiled and asked for the manager. (I was in uniform. It would not have been good form.)

"When?" I asked the manager with gritted teeth.

"Very soon, sir," she responded with a vain attempt at sincerity. "We have cars just being cleaned now."

I nodded and folded my hands across my chest.

After some pacing and a few anxious looks, I was on the road with my long, lost rental car. I slipped under the covers of my own bed at 0400. I now had a commuting adventure under my belt that would set the standards for future trips. It couldn't get much worse. As of this writing, I have been blessed with a base-transfer to Miami. For those of my colleagues out there that are still commuting, my hat goes off to you. You are true heroes. I have lost the courage to get to work in somebody else's airplane. Well ... maybe for a little while, anyhow. ✈

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By Tom Benenson

Do as I Say, Not as I Do

I WAS LUCKY. UNLIKE MOST FLIGHT STUDENTS, I had the same flight instructor not only for my primary training but for most of my other ratings as well. It's a situation, I've since learned, that's highly unusual. But my instructor, Jack Secor, had no aspirations to become an airline pilot; he was content to be a professional instructor. It was my good fortune.

I've railed against the fact that flight instruction is not a reasonable career choice, that what is arguably the most important and influential position in the aviation industry doesn't provide the compensation that would make it an end in itself. But, unfortunately, that's not going to change.

When I was actively instructing, students were assigned through a rotation

system. As a prospect came through the door to ask about lessons, we took turns greeting them and answering their questions. Since we were all hungry and not terribly well paid—I got \$6 an hour for Hobbs time, nothing for pre- and post-briefings—the system worked well to ensure that anyone coming through the door was met with a very friendly, "Hi. Can I help you?"

After answering questions, the next step was to arrange for an introductory flight; ideally, that same day. We were obviously on our best professional behavior and, if things went according to plan, we conducted the introductory flight, sold a Cessna student pilot kit and scheduled a first lesson.

The system worked well for us as in-

structors, but I'm not sure how successful it was with the students. We never thought to wonder why some of them never went further than asking questions. We always assumed they simply hadn't realized the cost and commitment involved with learning to fly and that turned them off.

I've learned since that anyone who musters the courage to step through an FBO's door to ask about flight lessons is already halfway committed. It should only be a matter of setting the hook and reeling them in. But over the years I've walked into FBOs to inquire about flight training only to be ignored by the person behind the counter—usually they're on the phone and don't even deign to nod or otherwise acknowledge my presence.



That's no way to win friends and influence potential flight students. But unfortunately, it's all too common.

Then there's the "catch and release" problem. Too often, students who have signed up for lessons show up for a couple of training flights and then drop out. If a student drops out then it's likely something other than the cost is at play. Somehow, the instructor unwittingly disillusioned the student and compelled him to invest in another pastime.

Rich, a friend of mine, took an introductory flight at a flight school where he was considering taking lessons. During the flight, the instructor intentionally put the airplane in a spin. When Rich asked him why he did that on an introductory flight the instructor told him he wanted to see if Rich would be scared. Rich wasn't. But he also knew better than to take lessons from that instructor.

Rich's account seemed a bit far-fetched, but then I met an instructor who told me he routinely did what he could to scare a potential student. "I want to find out early on whether they're serious about learning to fly or whether it will be a waste of my time." He really believed that that was a reasonable way to introduce someone to flying. Of course, with his attitude he probably had a lot of students stop taking lessons, if they ever even started.

Learning to fly is stressful. That's a given. But added to the mix is the telephone-booth-sized classroom and the engine and wind noise that make it almost impossible to concentrate. Even with noise-canceling headsets, the cockpit is far from an ideal learning environment. The learning curve isn't always smooth and there are frustrating plateaus, but a good instructor will work to keep it satisfying and fun. With a good student/instructor match, one-on-one training is as good as it gets. But instructors, like students, come in all types of personalities, and the fireworks from a combustible mix make learning difficult if not impossible.

It's interesting that, although most students are relatively successful in their "civilian" lives and command a certain amount of respect and civility from their colleagues and subordinates, many are willing to accept cruel and unusual punishment at the hands of an instructor. Students complain of instructors who yell at them; who belittle them; who slap them with a sectional when they do something incorrectly; who curse at them; who are late for lessons; who eat

their McDonald's hamburgers in the confined cockpit; who aren't good about their personal hygiene; who bluff their way through an answer; who do too much of the flying; who don't leave time in the schedule for pre- and post-flight briefings; and who seem to be repeating lessons in order to milk the student for more money. Students accept behavior from an instructor they would never accept in any other situation. Well, maybe if they were being held hostage by terrorists.

On the other hand, there are many good instructors who answer questions patiently and clearly so their students understand. If they don't know something they don't make up an answer, they take the question as "homework" and get back to their students with the correct answer, or they arrange to research the question together. There are responsible instructors who brief themselves before a lesson so they are prepared and don't have to ask the student, "What did we do last time?"



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To become instructors, we had to pass a knowledge test on fundamentals of instruction in addition to a test of our knowledge of things aerodynamic. We learned about lesson plans and objectives and goals and ways to foster learning. We learned them to pass the test—no instructor left behind—but often regrettably neglect to apply them in our day-to-day work as instructors.

A good instructor understands that individuals learn in different ways. Some people are visual and need to see things written or drawn, others are verbal and learn by hearing and still others need physical stimuli to grasp a concept. A good instructor will try to recognize what serves each student best and then play to his/her strength. Although one method of learn-

ing may predominate, most learning is, nevertheless, best accomplished through a combination of all three. A Chinese proverb sums up the learning process pretty well: "I hear, and I forget. I see, and I remember. I do, and I understand."

As instructors, it's important for us to recognize that it's the students who are paying and the choice with whom they're going to spend claustrophobic time should be theirs. But someone approaching learning to fly for the first time isn't in a position to know what to ask and how to "comparison" shop for an instructor.

If you're thinking of becoming a flight student, remember you're hiring the instructor. As the "employer" there's no reason not to conduct an "employment interview." It's important that an instructor have practical experience, but even more important is an instructor's ability to communicate and clearly answer your questions. During the interview you can ask some basic questions to see how the instructor expresses himself. "What makes an airplane fly?" "What causes a stall?"

Unless you sat on your father's lap and handled the controls of the family airplane, you're more than likely to require more training than the minimum number of hours specified by the FAA's regulations. Be wary of an instructor who leads you to believe you can get your certificate in the minimum number of hours. Some schools let students buy flight time in advance at a discount. That can be a way of reducing the cost, but be sure to find out what the school's refund policy is if, for some reason, you don't complete your training.

You can ask the flight school for a list of students as references. Typically any names you'll be given will be of happy customers, but you can ask questions such as: "I know it's great, but what one

After you begin your training you should expect—and require—common courtesy from your instructor. The instructor should be available at the scheduled time. It's a small thing, but aggravating if you, as do most of today's students, have a busy schedule. When I was taking seaplane lessons, I would schedule lessons on my lunch hour. Invariably, the instructor would be late for the lesson because he was having lunch. I scheduled the lessons well beforehand, so he should have been able to arrange his schedule to eat before or after our lesson rather than keeping me waiting each time. I never got the rating. Learning to fly is challenging enough without having to deal with an uncomfortable relationship with the instructor.



**Instructors, like students,
come in all types of
personalities,
and the fireworks from a combustible mix
make learning difficult if
not impossible.**

thing would you change to make it better?" that will elicit the information you're after.

Finally, the most important consideration is how well you interact with the instructor. Take an introductory ride with the person who will be your instructor and see how you get along. Are they happy to be instructing or is it only a step to an airline career? Are they easy to communicate with and do they respond to your questions so that you can understand their explanations? You could also ask about an instructor's own plans. Will they be there with you through all your training or will they leave before you've completed your rating?

There are instructors who are members of the National Association of Flight Instructors (NAFI) who have made the effort to qualify as "Master Flight Instructors." If an instructor has earned "Master" status it's a pretty good indication of their professionalism. But again the most important factor in deciding is how well you relate and how you feel about them.

As the student you're in the pilot's seat. You've hired the instructor to work for you and you're the one paying the bill. If you're not happy with the way he's doing the job you hired him for, let him or her know why and if they don't meet your standards, fire them!

We instructors are literally at the controls of the aviation industry. We're in a position to shape and define the pilots of the future. The pilots we train will learn from us about their responsibilities as citizens and ambassadors of aviation; they'll learn respect for the risks involved and develop a culture of safety only if we fulfill our roles as educators.

As role models we wear a mantle of authority that behooves us to always be professional, both in our dealings with our students and with the way we conduct ourselves in the system. For instructors who insist that students should do what they say and not what they do, a quote from Ralph Waldo Emerson is an apt warning: "What you do speaks so loud that I cannot hear what you say." ✈



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Gear Up



By Dick Karl

A Winter Test of Situational Awareness

FOR MANY YEARS THE INSTRUMENT approach plates for Lebanon, New Hampshire, posted an ominous footnote: "Caution—hazardous terrain all quadrants." For some reason this warning no longer appears, though I'm reasonably certain the mountains haven't moved much. There still isn't any radar coverage in the area and many of the approaches feature old-fashioned procedure turns. This is the only place we go regularly where our approaches are unsupervised by helpful controllers.

It is a few days before Christmas as I preflight our Cheyenne in Tampa in preparation for the trip to New Hampshire. DUATS has predicted a flight time of four hours and 38 minutes for the 1,100-nautical mile flight. This tells me that there isn't much help from the winds. The forecast is for overcast skies with limited visibility due to haze and mist until 5 p.m. After that freezing rain and lowering ceilings are in the cards. Since our endurance is five and a half hours, I accept the need for a fuel stop. Sometimes we go non-stop, but only when the destination weather is clear and we get a little bit better boost from the winds.

It is a beautiful but sad morning in Tampa. Our old football coach of the Buccaneers, Tony Dungy, has come back to town by Gulfstream because his son has been found dead here. I recognize the airplane with its Indianapolis Colts' logo on the tail and I notice that the crew is preflighting their airplane as I am doing the same with ours. "Are you taking the coach back to Indianapolis?" I ask. Yes is the answer. "Please give him our sympathies; he seems like a really nice man," I say. "The

whole family is wonderful. It is just so sad," says the Gulfstream's flight attendant. One of the pilots says to me, "Fly safe." "You, too," I respond. It is a quiet moment of perspective for all of us, shared on the ramp in the shade of two magnificent machines.

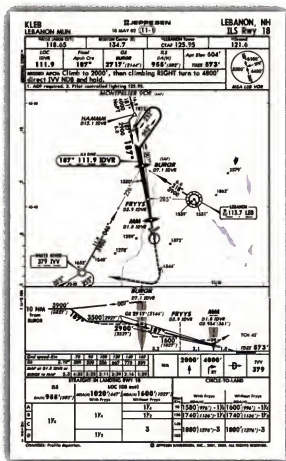
I file for Greenville, North Carolina, as

ing to Flight Level 200. Cathy sits in the back, facing backward, headset on, reading the morning newspaper's story about the Dungs. Thirty minutes later, Jacksonville Center clears us direct to KPGV, climb and maintain requested altitude of 230. "Thanks for the Christmas present," I say, noting that nobody seems reluctant to say "Merry Christmas" on the center frequency.

I enter 230 into the altitude preselect, sit back and admire the view. There's Jacksonville to the right. It is clear for the next 700 miles, thanks to a large area of high pressure over the southeast. I'm jolted from this reverie by a sudden pitch up followed by an immediate pitch down. I scramble to disconnect the autopilot. We level off, with lots of rettrimming, at 22,900 feet. Cathy has screamed, but I wait until we're level before I explain that the autopilot developed a mind of its own. She is frightened and my consoling doesn't accomplish much. I don't know it, but there is more to come.

I cautiously hit the altitude hold button and see the flight director's command bars stabilize appropriately. I engage the autopilot with my thumb poised over the disconnect button. I promise Cathy that I'll keep a finger on that button for the

■ **Hamburger and fries sounds easy enough to me.**



a fuel stop. With any luck we'll beat the freezing rain to the Lebanon airport by two hours. This is not the last good decision I'll make today.

With our packages stowed, coffee pot full and flight plan stored in the Garmin GPS, my wife and I start out, step climb-

rest of today's flying. I think back to my annual FlightSafety training. Aren't there five ways to disconnect the autopilot? I can think of electric trim switch, disconnect button on each yoke, the autopilot switch and the circuit breaker. We fly along. Occasionally the command bars

Gear Up

hiccup up but settle right back to level flight, which makes the airplane feel like it has just gone over a small speed bump. Cathy seems not to notice.

A tailwind develops and I flirt with the idea of going nonstop. The Lebanon weather is displayed on our Avidyne EX 500: "2,700 feet overcast, 4 miles visibility in haze." I change our destination from Greenville to Georgetown, Delaware, which gives me more time to think about the appealing idea of a non-stop flight. Ev-

erything seems to be working okay now.

An hour later I chicken out. We land, refuel, and refuel at KGED. Soon we're climbing over the New Jersey coast, heading for the tip of Long Island. It is still clear and I watch the string of jets heading for Philadelphia to our left. When we reach our assigned altitude of 210, I hit the alt hold button. The command bars stabilize and I engage the autopilot. It is -20°C outside. So far, so good.

Over Connecticut an undercast forms,

looking like a dirty gray fleece blanket. We've got a good tailwind now and I start second guessing my decision to stop for fuel. Lebanon's weather is holding up. I enter the ILS 18 approach in the Garmin and call up the approach plate on the Avidyne's JeppView. When it comes to Lebanon, Boston Center can get you down to 4,700 feet, but that's it. If you don't see the airport, you can anticipate an instrument approach. I review the altitudes: 3,900 feet for the procedure turn outbound, 3,500 when established inbound, 2,900 at the Final Approach Fix, called BURGR. (Two other fixes on the approach are HAMMM and FRYYS, get it?) The decision altitude is 955 feet, which should be of no concern.

Eighty miles out I get the ATIS. All is as I expect: 2,700 feet over, 4 miles, ILS 18 in use. Boston Center starts us down and we enter a wet mass of cloud, tops about 19,000 feet. The cloud is not thick and is a reddish-brown gray in color. There will be nothing more to see out the windshield until we're on final. I tune in the localizer frequency on the Garmin and then, in a moment of uncharacteristic carelessness, I also tune the number two nav to the same frequency and I realign the copilot's gyro compass. This compass is not slaved like the one on the HSI right in front of me. It precesses like crazy and I never look at it. My finger is still hovering over the autopilot disconnect button. I turn on the windshield heat and watch the wet compass turn 30 degrees due to the electrical field.

Boston says descend maintain six, cleared direct to BURGR, but expect to maintain 6,000 as there is traffic on the ground at Lebanon and we can't be cleared lower until he's in radar contact. A wrinkle in the fabric of my carefully rehearsed approach has appeared. I start thinking about losing 2,100 feet in the procedure turn when the flight director command bars just pull up and disappear, like a curtain rising at a play. This disconnects the autopilot automatically and introduces more drama than I'm eager for. I think, "Well, the autopilot wasn't working all that great this trip, so I'll just plan on hand-flying the airplane and using raw data for the approach." I retrim the airplane and try idly to retrieve the command bars. They reappear, but when I push the heading select button, they withdraw again.

Just as I intercept the localizer outbound, the HSI starts spinning like a

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cheap child's top. A compass flag descends telling me that the HSI is no longer reliable. The artificial horizon appears to be working as it agrees with the standby horizon and with the copilot's horizon. The only apparently working compass is now the copilot's, way over there on the right side and not that easy to see with these damn bifocals. I contemplate turning off the windshield heat and using the easier to see wet compass, but, when I look up I see ice on the unheated portions of the windshield. I reason that I want a clean window if I ever get us out of this mess.

Boston clears us to 3,900 feet and okays the procedure-turn outbound. I set the Avidyne to the chart page, where I can see our airplane bug tracking outbound on the localizer. Can I make the appropriate turn to 052 degrees with this set of instruments? Will something else quit in the next minute? Should I just add power and climb back into radar coverage, keep the airplane level and get vectored to a VFR airport and pass up this procedure-turn excitement? I am silently glad that we stopped for gas, but I am too busy to look for the HSI circuit breaker.

Looking over at the copilot's compass, I turn right, vowing to maintain 4,700 feet

until I am established on the localizer inbound. Our little airplane makes a perfect turn and covers the outbound track on the chart. A minute later I start the inbound turn, being very careful to make the turn standard rate. I hate to admit it, but I almost always use the autopilot heading bug for these maneuvers. Not today.

The HSI localizer indication may be working, but I can make no sense of it as the compass rose rolls around like the death throes of a dying salmon. I am thankful that, in a moment of bored carelessness, I tuned the number two nav to the localizer. I level out on what I think is a heading of 232. The localizer needle does not appear to move, however. I look up at the chart page and see that I have overshot the turn and we are turning east, away from the localizer. I make what I think is a 30-degree correction to the right. Several years ago a Lear Jet with everything functioning got lost doing exactly what I'm doing right now. Local pilots predicted that the airplane would be found the following autumn during the hunting season, but it was several years before it was discovered.

The localizer needle centers, I deploy 15 degrees of flaps, the gear, and a deep

exhale of breath. I would never have continued the approach but for the situational awareness provided by the JeppView approach chart and that superimposed little green airplane. Seconds later we are spit out of the cloud into the dark, gray late afternoon mist of New Hampshire. For some reason I think to myself that this is the second shortest day of the year when it comes to sunlight. Ahead I can see the dark gray-brown scar of a runway outlined by white snow.

After we touch down and taxi in, I tell Cathy about the compass, the flight director and my decision making. She is quiet. When I call my friend JC that night and tell him the story, he laughs when I tell him, "All I had was the copilot's compass. No HSI, no autopilot, no flight director, no altitude preselect. I mean it was almost needle ball and airspeed."

"Ah, come on," replies the retired 747 captain. "You had three artificial horizons, two altimeters, deicing boots, windshield heat, great avionics and plenty of gas."

"Okay, yeah," I say. "But I had only that one backup compass."

JC's response reminds me why I like aviation so much. "But that's what it's FOR!" he says. ✈

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Flying Lessons

By Lane Wallace



Directionally Challenged

THERE WAS AN OP-ED PIECE IN THE *NEW York Times* not too long ago that bemoaned the advent of GPS technology for cars, because it was going to spoil all the fun of wandering around and getting lost on road trips. The man should have talked to me. I could have assured him with great confidence that it is possible to still get quite turned around or lost with not only a working GPS, but even with a radio, map, and an eye-in-the-sky perspective at your disposal. It just takes a little more talent, that's all.

Take, for example, the flight I took with my buddy Jeff the other day. It was almost Los Angeles-grade hazy and, even though we waited until mid-afternoon, fog was still blocking the entire central valley and North Bay. So we just headed

southeast from Palo Alto to a small, uncontrolled field south of San Jose, where I practiced landings until the sun began to sink into the hazy layers of dusk.

South County airport lies a grand and mighty distance of 35 nautical miles from Palo Alto. And Jeff learned to fly here, for goodness' sake. So you'd think we could find our way home without incident, especially with a Garmin GPS sitting brightly on the glareshield.

Right. So did we.

But as we skirted the San Jose airspace to the southwest, we found ourselves looking north into a darkening, gray murkiness that afforded a decent view of the western sky, horizon, and mountain peaks sticking up out of the haze, but completely shrouded the landmarks below with a

moist curtain of steel tones. This, of course, is where a GPS supposedly comes in handy. So I glanced at the Garmin, saw the airport marking, and steered us toward it. The rest would become clear by the time we needed it to. At eight miles out, I contacted the tower and was cleared, number one, for landing.

Jeff, however, was beginning to frown. "I think you need to correct to the right," he said.

"No," I answered. I'm heading straight for the airport. Look." I gestured to the GPS. Jeff looked at the airport symbol I was indicating.

"Lane, that's San Carlos, not Palo Alto," he said.

Whoops. San Carlos lies just a few miles



Flying Lessons

north of Palo Alto, situated almost identically along the San Francisco Bay. And I would bet good money that I'm far from the first pilot to ever mistake the two.

"Just turn and head toward the water," Jeff said, gesturing at a vague line I could just make out in the murk. With the normal landmarks obscured and having gotten off course, everything looked odd. I was still looking out the window trying to sort it out when the

tower called and asked if we had the airport in sight.

"I do," Jeff answered confidently, so I told the tower we did.

Half a minute later, the tower controller called back. "Are you *sure* you have the runway?" he asked. Note to self: When a controller asks you for a second time if you really see the runway, chances are pretty good that you're not where you think you are.

Just as I pressed the mic to answer, I

looked down and saw the bright white tent-tops of the Shoreline Amphitheater, just in front of my right wing. But if that was the amphitheater, that meant that Palo Alto's runway must be ...

I looked left, and saw the runway right where it should be, but completely not where we thought it was, at our 10 o'clock position, about a mile away. "Uh ... that's affirmative," I answered sheepishly. Of course, the runway looked a tad smaller than usual, because in my distracting efforts to sort out landmarks and my GPS error, we'd ended up a tad higher than we should have been. By, like, a thousand feet.

Now what? We were, by a stroke of luck, the only plane in the pattern. So I chopped the power, pulled the nose up to slow into flap speed, looked right, and then, the coast clear, banked that way to give myself a little more maneuvering room.

"Niner-four-uniform, where are you going?" came the tower controller's exasperated voice through the headset. I can only imagine what he was thinking at that point. Fortunately, I will probably never have to know.

"Just doing an S-turn to lose a little altitude, sir," I answered as I turned back around to a long final. Well, kind of an S-turn, anyway. I lowered full flaps and immediately put the Cheetah into the kind of slip I used to use with the Cessna 120, the controls fully deflected all the way down to the runway. The landing itself, when we finally got to it, was actually surprisingly nice.

"Well," I commented wryly as we taxied off the runway, "I guess I'm now current on *non-standard* approaches, as well."

Thirty-five miles to a familiar airport, with a working GPS on board, and I still managed to get completely sideways in my navigation. That, my friends, takes talent.

On the other hand, I think I may have an unusual aptitude in this particular area, which has showed itself repeatedly, but not necessarily consistently, ever since I learned to fly. Sometimes, my internal compass works like a Swiss watch. But sometimes, the gears just seem to slip a bit. It's not that I get *lost*, you understand. I'm just sometimes a bit ... well, *directionally challenged*, as it were.

It was worse before the advent of GPS, of course. I will never forget a trip my friend Kimberly and I took more than 10 years ago to Northern California. I was

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FLYING

doing a story on the fly-in community at Cameron Park, just east of Sacramento, so while I did six interviews in as many hours, Kimberly bopped around to several nearby airports to visit friends. Consequently, we were both very tired when we climbed in her Luscombe to head west to Santa Rosa, where we planned to spend the night.

I gave Kimberly vectors to skirt the Sacramento airspace to the south, which got us more than a little turned around before all was said and done. Then, making the skewed mental assumption that the coastal mountains ahead must be west of us, I told her to head toward them. Unfortunately, it turns out that the California coastline runs primarily southeast to northwest. So heading for the coastal mountains actually sent us *southwest*, at a fairly good angle off course.

After a few minutes' flying time, I looked at the sectional and said, "Now, there should be an airport coming up out your window somewhere."

"Yeah, there's one right here," she said, as I continued to peruse the map. "It's kind of big," she added after a moment. Big? My map showed an uncontrolled field with a single runway. I looked up ... and saw Travis Air Force Base's two 11,000-foot, staggered runways completely filling Kimberly's window.

"Turn right! NOW!!!" I yelled sharply as I scrambled for Travis' frequency. Fortunately, that was a lot of years ago, and we did not get escorted to the ground by fighters or Blackhawk helicopters.

Nevertheless, none of my friends was surprised when the very next purchase I made after buying the Cheetah was a Garmin Pilot III GPS. No more blundering into unexpected airports or airspace for me, by golly. When I took cross-country flights into unfamiliar places, I'd pre-program my route into the Garmin and simply follow the line on the map. On course, no mess, no fuss, no directional worries at all. I always kept a sectional on my lap, but my confidence came from the dark line across the light gray screen on the glare shield in front of me. I even got to feeling a fair bit proud about my ability to navigate with GPS accuracy.

Ah, the pride that goeth before the fall.

Sometime after I bought the Cheetah, Kimberly and I were coming back in it from a trip north of Klamath Falls, Oregon. It was a warm, sunny day, and I was happily following my pre-programmed GPS course across the Klamath Valley

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Flying Lessons

while Kimberly and I shot the breeze. As we headed toward the ridges near Mt. Shasta, I even noted with satisfaction how incredibly well I was adhering to my dark gray course line.

As Kimberly and I chatted on, however, I noticed that we seemed to be heading straight for a section of ridgeline that was significantly higher than our altitude. I checked the GPS. No, I was still precisely on course, and I knew I had plotted the course to go through a cut in

the ridgeline. We just must not be able to see it yet.

It never ceases to amaze me how long it can take the human brain to adjust to the true reality of things when it sets itself on a different view of a situation, person, or event. But the dissonance finally gained traction in my mind at almost the exact same moment as the looming terrain conflict registered with Kimberly.

"Uh, Lane?" she said in a questioning

voice. "That ridge there looks kinda higher than we are."

"I know," I answered, "but look. The GPS says..."

I looked at the Garmin and stopped, mid-sentence. The course on my GPS had just gone completely haywire. The line behind the airplane symbol was completely straight, as any GPS course should be. But at the very upper edge of the moving map display, which showed where we were headed, the straight course line suddenly dissolved into a compact, zigzag pattern, like a seismograph recording of the San Francisco Quake. What on earth...? I zoomed the display out several times as I tried to figure out what would make a GPS course do that.

The answer was: nothing. Forty miles or so earlier, my GPS course had forked away from a very straight road that was also depicted on the map. I must not have been paying attention at that particular moment, and I had the display zoomed in enough that when I *did* check it, all I saw was the road, which I had been following faithfully ever since. The zigzags were simply the road doing what all good roads do when they encounter a steep ridgeline they need to cross.

"Oh, my God," I exclaimed. "I've been following a road, not the course!"

"Whatever," Kimberly answered. "But if I were you, I'd be either turning or climbing about now." God bless friends and low-key flying companions. In the end, I climbed *and* turned, accompanied by Kimberly's laughter—which continued, along with some friendly ribbing, for pretty much the rest of the flight home.

Have I learned a bunch of lessons from all of this? Oh, yeah. Every day's a school day, as my sister likes to say. But am I silly enough to think I don't have many more refresher lessons in my future? Not by a long shot.

Technology is a wonderful thing. But the human brain, especially when aided by presumption, distraction, challenging weather conditions, or just sheer fatigue, will always find a way to get it sideways. So all those old-school road explorers need not worry. They, like us, will still find themselves scratching their heads, seeing unexpected sights, and making all sorts of unplanned U-turns on the side roads of life. For on the road, everyone follows Visual Flight Rules. And with VFR travel, "getting there" can always turn into a bit of an adventure. Even with a GPS on the dash. 

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Technicalities



By Peter Garrison

Scenes From the "Lovely War"

"... SKELETAL HANDS, SHARPENED NOSES, tight-drawn cheek bones, the bared teeth of a rictus smile and the fixed, narrowed gaze of men in a state of controlled fear ..."

Thus Alvin Kernan, a Grumman TBF Avenger gunner in the Pacific during World War II (and later provost of Yale University and dean of Princeton's graduate school), described what historian John Keegan called "the characteristic physiognomy" of fighter pilots. Keegan quotes the passage in a book about the First World War. Kernan hadn't seen those pilots; but it is likely that they looked much the same in both world wars. Perhaps Spartan hoplites looked this way at Thermopylae. At any rate, I happened upon the description shortly after seeing a screening of a film, *Flyboys*, about American pilots in the so-called "Great War." The characters in the film, not surprisingly, do not have that chroni-

cally tormented look, and with a single exception they fly and fight with the jolly nonchalance that stories of white scarves and sportsmanlike conduct have led us to associate with the pilots of that war.

Flyboys concerns the so-called Lafayette Escadrille, originally known, until Germany protested the interference by a supposedly neutral nation, as the Escadrille Américaine. The French word *escadrille*, which is related to the English *squadron*, means "flight" in the sense of a group of airplanes. Lafayette was the French marquis who fought on the American side during the Revolutionary War, and the American pilots who joined the Escadrille, long before the United States entered the war in its final stages, saw themselves as returning the favor. Relations between us and the French have been tepid lately, and although the idiocy of Liberty Fries is almost forgotten it is still fashionable here to make jokes about the al-

leged military incapacity of the French. Those who make such jokes have evidently forgotten Napoleon. They have also forgotten World War I.

Most wars have a cause that can be expressed in 25 words or fewer, but the cause of World War I is mysterious. More than by any single person or outrage, it seems to have been triggered by the pent-up pressure of the Modern World straining to be born. To prove the inferiority of horses and swords to tanks and machine guns, men crouched for years in muddy trenches, emerging from time to time to slaughter one another by the millions.

This was the war in which all the future military applications of aircraft made their debuts. First airborne scouts reconnoitered the movements of enemy troops, usurping a role that had previously belonged to tethered balloons. Armies that did not want their movements observed sent up airplanes to discourage the reconnaissance, and opponents then sent up escort airplanes



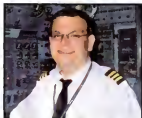
to destroy the interceptors. A new battleground, the air, unused since the fall of Lucifer, came into being. What the duels of little airplanes lacked in fundamental military impact—scholarly surveys of the war make scant mention of its aerial component, and my *Encyclopedia Britannica* accords far more importance, among military innovations, to the submarine—they supplied in drama, adding a touch of glory, like the pink glow of sinking sunlight on clouds above an already darkened landscape, to the dismal slaughter below.

Taken on its own terms, however, the pace of aeronautical progress during the war was astonishing. Hostilities began in 1914, just six years after Wilbur Wright had dumfounded Europe with his flying. Almost immediately, rickety openwork stick-and-wire sporting and exhibition aircraft began to evolve into compact, streamlined, maneuverable and robust biplanes powered by efficient, light, powerful and sophisticated engines whose power-to-weight ratios were comparable to those of modern reciprocals. By the end of the war, builders had already arrived at the highly streamlined airframes of Pfalz and Albatros, the wood-surfaced cantilever monoplane wings of the Fokker D.VIII, the aluminum structure of the Junkers J-1, and the liquid-cooled vee engines that would pretty much define military aviation until the arrival of the jet engine.

The dominant engine type of World War I was the rotary. Its story is a curious one. A five-cylinder rotary built into the rear wheel of a motorcycle had been exhibited in Paris in 1889, but the type was developed for aeronautical applications by three brothers named Seguin, whose grandfather had constructed the first French locomotive in 1829. They called their company the Société des Moteurs Gnome—"Gnome Motor Company"—apparently alluding to the legendary race of hardworking subterranean dwarfs who also lent their name to the "gnomes of Zurich" beloved of the financial pages. What set the rotary apart from other engines of the time was its combination of effective cooling with light weight. Fifty-horsepower Gnome engines, meticulously made and very expensive, were phenomenally successful, and by 1914 they were being manufactured under license in several European countries. Four thousand had been sold even before the outbreak of the war.

The idea of the rotary was to fix the crankshaft to the airframe and the propeller

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ler to the crankcase, allowing the latter to rotate, along with cylinders, pistons, manifolds, and valve train. In some ways this arrangement was inconvenient. Lubricating oil, pumped centrifugally to the cylinder heads, could not return to the crankcase and instead simply blew overboard. Rotary-equipped airplanes had large oil tanks and filled them before each flight. Castor oil, beloved of English nannies, was used, being the best lubricant available, and supposedly the laxative effect of the cloud of vapor enveloping the pilots obliged some to land unexpectedly; though how one would distinguish the effect of castor oil from that of sheer fright I do not know.

It is often said that powerful gyroscopic forces produced by the rotating engine contributed unintended components to all maneuvers and made rotary-equipped airplanes much easier to turn to the left than to the right. This may be a canard. The gyroscopic effects of the huge propellers these slow-turning engines swung probably equaled or exceeded those of the engines, whose weight was concentrated near their axis of rotation. Collector and

England and Germany. The United States lagged behind, producing only 28,000, because, Arango suggests, the land of Henry Ford lacked the conservative culture of artisan manufacture that still existed in Europe, and particularly in France, and that was critical for the production of engines that were, in important respects, hand-built. Something similar happened in World War II, when Packard, after trying in vain to make sense of British blueprints for the Merlin, eventually redesigned the engine from scratch for mass production.

Arango's collection of World War I aircraft is the subject of a recent book, *Ghosts*, which marries magnificent photography of his airplanes by Philip Makanna with thoughtful commentary by modern builders and pilots, including Arango himself, and excerpts from the writings of pilots from the Great War. Prominent among the latter is Cecil Lewis, whose eloquent *Sagittarius Rising*, now regrettably out of print, is one of the definitive accounts of the air war's gallantries and miseries.

Among many curious aspects of the rotary engine is its utter disappearance after

through one another with the precision of the Thunderbirds, that I doubt could have been of much use in actual warfare. The speed and vertical capability of the airplanes is exaggerated—forgivably, considering the expectations of an audience conditioned by video games. But a number of the duels of single aircraft convey a plausible picture of fighter tactics that will satisfy contemporary pilots' sense of the dynamics and behavior of real airplanes.

The script kills off its characters with a regularity appropriate to a conflict in which the life expectancy of fighter pilots was measured in weeks. In one scene, new recruits are issued pistols with the advice that a bullet to the head might be preferable to riding a burning airplane to the ground. I don't know whether there is a historical basis for this detail. In another, a pilot falls (or jumps)—they didn't have parachutes—from his stricken airplane; this was, in fact, the fate of Raoul Lufbery, one of the first aces of the Lafayette Escadrille. There are several instances of the gallantry toward a defeated or disabled enemy that is often presented as a hallmark of that war, though it actu-

Half of the aero engines manufactured during the war were rotaries; after it, none.

aviation historian Javier Arango, who has flown many rotary-powered airplanes and has also flown the same Sopwith Camel with both a rotary and a fixed radial engine, reports that the gyroscopic effects of the rotary are not large enough to be noticeable in the general "noise" of flying a very light and unstable airplane with a very powerful engine and propeller.

Gnome cylinders, machined from solid bars of nickel steel, had a wall thickness of about 1/16 of an inch and were prone to thermal distortion because the leading sides of the cylinders cooled better than the trailing ones. The engines had to be overhauled—a simple job, fortunately—every 10 or 15 hours. When W. O. Bentley of auto racing fame designed a new rotary for the British Admiralty, it had aluminum pistons running in cast-iron liners shrunk into aluminum cylinders, an arrangement that improved both cooling and rigidity and eventually permitted an output of 230 hp, about the maximum developed by any rotary.

By the end of the war, France had produced 40,000 rotary engines, with comparable numbers being manufactured in

the war. Half of the aero engines manufactured during the war were rotaries; after it, none. Andrew Nahum, upon whose excellent little book *The Rotary Aero Engine* I have drawn from for this article, argues that the Achilles' heel of the rotary was its inability, for various reasons including its system of air induction through the crankshaft, to be scaled up. In his view, improvements in the power-to-weight ratio of fixed engines eventually doomed the quirky and cantankerous rotary—but not before it had powered most of the small fighters and scouts of the war.

The film *Flyboys*, which is not yet in theater release, was directed by Tony Bill, himself a pilot and owner of a Siai-Marchetti 260. Bill seems to have been at pains to ensure the realism of aerial sequences. Inevitably, these passages involve a good deal of computer graphics; most of the airplanes you see don't actually exist. Sometimes the computer people go overboard, crowding the sky with improbable numbers of airplanes in impossible proximity to one another and dreaming up tactics, like head-on encounters of tight formations that skim

ally shines here and there all through military history, alternating with the rather more prevalent pattern of compulsive butchery. The most deadly of the German pilots in *Flyboys* is a steely-faced Richthofen-like character whose Fokker Triplane—an inferior design in many respects, by the way, and soon abandoned—is painted black. I will not spoil the suspense by revealing his fate.

Most of the characters in *Flyboys* don't seem to mind dying. Indeed, a nearly psychopathic indifference to death, or confidence in one's own good luck, would be required for someone to leave the peaceful confines of the good ol' USA to get shot at in a Nieupoort 17. I could not have done it. That a few pilots survived long enough to record great numbers of victories while others died almost as soon as they began fighting suggests that this was an activity for which some people had far more talent than others. To be one of the less talented ones, and realize that you have stumbled into combat with one of the more, would have given you the sinking feeling you might get going one-on-one with Kobe Bryant. 

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I Learned About Flying From That

Too Close to Crawford

IT FINALLY CAME. I DON'T RECEIVE A LOT OF MAIL FROM OKLAHOMA City, and virtually none from the U.S. Department of Transportation. This letter was important and was expected. As I looked at the letter, afraid to open it, it took me back to that August day almost one year earlier.

The sky was bright as I drove to the West Houston Airport in early August. Typical Texas summer morning, already warm and humid with the promise of few clouds and scorching heat. The briefer confirmed my ground observation and called the route "clear below one-two thousand" and even a tailwind for my westbound departure. Papa Four Niner, the prohibited airspace around the president's Crawford, Texas, ranch, was normal size and the TFR, which expands the airspace from the usual five miles to 30 miles, would go into effect tomorrow, the briefer told me. I fly Texas and know the airspace very well. I am also well versed in Papa Four Niner and the all so common TFR when Mr. President is in residence. The 115-nm trip to Georgetown, Texas, was uneventful and snappy in my trusty Archer.

After a day of software development, I mounted up for the second leg up to Grand Prairie in the DFW area. With the GPS tuned up, the autopilot engaged and Rush on the radio, I blissfully flew VFR straight line Georgetown to GPM. I always enjoy flying, especially in "severe clear" cool summer air. Well at least cool at 7,500 msl. The course was close to Papa Four Niner, but would clear it by about 5 miles. No worries, the president won't be home until tomorrow; it's a beautiful day let's enjoy the ride.

Suddenly, an F16 flew off my left wing about a half mile, flaps extended and chopping up air. So much that when I hit his wake it tossed the Archer right to left and made a noticeable impression. At first, I was shocked. It was surreal. What was going on? Was this a near miss? Or ... Rush had to go and I immediately made a right turn from my 010 course to due east. The TFR must be in effect! I saw the fighter coming around for another pass. This time it was two jets in sequence both at a half mile and as slow as they could fly. This could not be good. I immediately contacted Waco Approach, identified myself and let them know that two jets were obviously most interested in my flight path. Then I got the bad news. I had just busted a TFR and drew the attention of several federal agencies and the F double A. Waco gave me a code and advised that my new destination was Waco Regional. Anxious to comply, I followed their precise instruction and landed Waco. The jets followed me and on final a military helicopter not only requested "Number two" behind me, but also taxied behind me as the tower told me where to park. These guys were serious.



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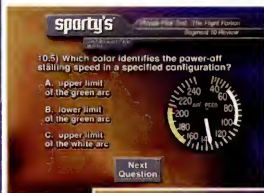
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Once on the ground I called Gray Approach, as instructed, and gave the obligatory name, rank and pilot certificate number. I was also advised to wait on the ground for a Secret Service agent. The agent showed up in about 10 minutes and was cordial and professional. He showed his identification and wanted the same from me. He asked me a few questions, searched my Archer and called somebody for a little mini-background

check. Being Joe Citizen finally paid off and the cordial Mr. Brown sent me on my way. As I found out later, the TFR had gone into effect just a few hours earlier than my departure. The president was inbound and tensions were high during the summer. One of the good guys just became a victim of his own complacency.

"This is Bill," my voice bellowed as I picked up the cell phone. "Hello, Bill, this is Larry P. from the Fort Worth Flight Ser-

vise District Office. How are you?" Part of me said that the FAA would do nothing more than record the incident, part of me was worried about losing my ticket. It had been more than a month now. Enough time to worry and hope that the incident was over. "Hey Bill," Larry said in a friendly tone "what was it like to be intercepted by two F-16s? Did they get your attention? Was it kind of fun?"

I was not sure how to take the question and simply said, "Larry, fun is not a word I would use to describe the incident; it was a shock and the most embarrassing moment of my 15-year flying career." Larry had done his homework and knew about my pristine flying record, my instrument rating, he knew I owned the airplane and rather quickly said, "Bill, tell me what happened?" I spent the next few minutes telling him my perspective and pleading my case. "Larry," I began, "I received a briefing at 7 a.m. that morning and was advised that the TFR would not be active until tomorrow." "Do you recall which FSS you called?" Larry asked. "No, but I will get my cell phone records and get back to you," I retorted.

Larry went on to tell me that he might be able to pull the tapes. I asked if I could listen too and he said no. It's funny, you have vivid memories of conversations, and I absolutely recalled the briefer using the word "tomorrow." However, a month had already passed and now I just made a statement to a FSDO Inspector that only he could verify. I realized how important my recollection needed to be.

Larry ended our conversation with two items: "Get me your phone records so we can see when and what number you dialed and prepare your own statement that will be submitted with my investigation."

I was able to quickly find out and prove that I called Montgomery Flight Service Station at 7:04 a.m. August 3, 2004. I faxed it over to Larry along with my statement of events that day which included a written version of the "tomorrow" comment by the briefer. I asked Larry if he had a chance to review the tape and he said no, laughing, if I can even get it it will be weeks before I can review it. "Don't worry Bill, your statement looks fine, if we can find the tape it will be more help. You have been open, honest and cooperative—that means more than you might think."

"Larry, can I keep flying?" I asked. "Yes, you may," said Larry. "This matter is under investigation and during that time you

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may fly as usual." Let the waiting begin.

Several more weeks passed with no news. One morning I got a message to call Larry: "Hey Larry, Bill Hood calling, how can I help you?" "Bill, I did listen to the tape and thought you might like to know what we found," Larry offered in an even tone. "By all means, Larry," as I braced for impact. "Bill, the briefer said tomorrow in no uncertain terms. He made a mistake. This information will be submitted with the final report. I can't make you any promises, but I am going to recommend no action be taken. Your statement and my fact finding will be sent to Legal for review. It may be a while. If I need anything else, I'll contact you."

And now the letter. It was short and sweet and they got to the point quickly. "The matter has been investigated and it has been determined that your action did not result in a violation of the Federal Aviation Regulations. You may consider this matter closed." And so it was over.

While I was "off the hook" from a technical perspective, I still made a few mistakes. I did not get a briefing before my second flight of the day and I should have. It would have been simple and I doubt, with the TFR in effect at that time, I would have gotten a "tomorrow" answer from the briefer. TFR briefing is easy to get if that is all you need, simply type "TFR" into Google and it will return the FAA-web page that lists TFRs.

I also think I did a few things right. I was open, honest and responsive to the FAA. I gave them a comprehensive statement and offered any assistance I could provide. They worked with me, too. The FSDO investigator went to a lot of time and trouble to pull the tape and review it. It was essential to my case since the tape confirmed my statement. You often hear about the FAA being "out to get" somebody, but that was not my experience at all. Larry was genuinely interested in my side of the event; he listened patiently and then proceeded to help.

The world has changed and GA with it. In the old days we could simply "saddle up" and go. Not anymore. It is essential to understand not only the length of the runway, the weather, etc. Now we must consider Temporary Flight Restrictions or risk being in our own surreal airshow as the main attraction. ✈

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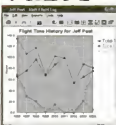
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The following are excerpts of official NTSB summaries
of general aviation accidents in the continental United States.

On the Record

CESSNA 210M

Watertown, Minnesota

Injuries: 1 Minor

While descending into the intended destination there was a total loss of engine power. The pilot reported that he was unable to restore engine power and performed a forced landing into a soft field. During the landing the nose gear collapsed and the airplane nosed over. The pilot reported that the airplane was completely fueled prior to the initial flight of the day and he had flown approximately 3.6 hours since the last fueling. The pilot told a Federal Aviation Administration (FAA) inspector, "... he [the pilot] forgot to switch the fuel selector to the other tank." Subsequent to the accident approximately five gallons of aviation fuel were drained from the right wing fuel tank and there was evidence of a fuel spill around the accident site.

Probable Cause(s): The improper fuel management by the pilot, which resulted in fuel starvation and subsequent loss of engine power. Contributing to the accident was the soft terrain in which the forced landing was completed.

PIPER PA-32-300 CHEROKEE SIX

Atlanta, Georgia

Injuries: 4 Fatal

The recently instrument-rated pilot departed on an instrument flight in instrument meteorological conditions with low ceilings and turbulence. Radar data showed the airplane climbed to the assigned altitude but failed to maintain the assigned heading. Radar data indicated the airplane flew a path that included two wide, constant-rate, 360-degree turns to the right. Air traffic controllers twice reassigned the heading, and the pilot acknowledged the instructions each time. About eight minutes after departure, the pilot reported the airplane

was in a spin, and the airplane impacted terrain seconds later in a steep, nose-down attitude less than two miles from the airport. The wreckage was found scattered along a path 200-feet long by 80-feet wide in a wooded area. Fuel was present at the site, and examination revealed no evidence of mechanical malfunction of the engine, airframe, or recovered instruments.

Probable Cause: The pilot experienced spatial disorientation that resulted in the loss of control.

BEECH C24R SIERRA

Olar, South Carolina

Injuries: 1 Uninjured

The pilot reported halfway into his flight from Savannah, Georgia to Columbia, South Carolina, he noticed a "smoke smell" and "smoke rising in cockpit." About the same time the red "in transient" landing gear light illuminated steady. The pilot positioned the landing gear handle "up" with no results, so he turned off all electrical power, cranked the gear down manually, and declared an emergency with Columbia approach control. He made a precautionary landing to a vacant field, and the right wing collided with a tree. Postcrash examination by FAA and NTSB personnel could not duplicate any "smoke" or overheat condition. The landing gear "power pack" was located behind the cockpit, and evidence of hydraulic leakage at that location was revealed. The inspectors stated that the pilot may have smelled hydraulic fumes.

Probable Cause(s): The pilot's failure to execute the proper remedial action for hydraulic leak fumes in the cockpit, and his decision to perform an immediate precautionary landing to a vacant field, resulting in collision with a tree. A factor in the accident was the occurrence of a hydraulic leak while in flight. ✈

Flashbacks



■ The Lear Fan made its first flight on New Year's Day, 1981. The carbon fiber turbo-prop pusher was be-



ing funded by the British government, which expected it to provide jobs at a factory being built in Northern Ireland. Several Lear Fans flew, but it was never produced.

■ RCA sold its avionics division to Sperry for \$44.6 million. RCA was a major producer of weather radars, and other avionics. RCA and Sperry are now components of Honeywell.

■ A 10-foot fuselage stretch of Gulfstream G-II turboprops was approved by the FAA. A total of 37 passengers could be crammed in and at least one commuter airline planned to use the conversion. The project didn't succeed in the market.

■ We profiled the oddball

Czech twin Super Aero 45 built in the late 1940s. No modern powerplants were available in war-ravaged Czechoslovakia at the time and the designers had to make do with a pair of Walter Minors that could make only 105 hp each. With so little power, a glider-like wing was necessary.

■ In 1981 we reported that the sale of used fixed-gear singles was very slow, a total reversal of today, where



retractable singles have lagged the straight-leg used airplanes in demand. We blamed slow sales 25 years ago on high fuel prices, high interest rates and a big inventory of used airplanes.

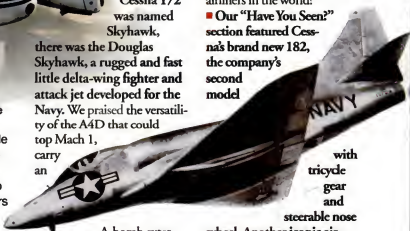
Twenty-five years ago Cessna's new 425 twin turboprop was on our cover. The Corsair—a name that didn't stick—was essentially a 421 with the Continental piston engines replaced by Pratt PT6 turboprops. The 425 is one of the most in-demand turboprops in the used airplane market today.

Fifty years ago James W. Connally, a cadet at the then brand new U.S. Air Force Academy in Colorado Springs appeared on our cover holding Mach 1, the Academy's mascot. That's an F-86 in the background.



■ Before the Cessna 172 was named Skyhawk,

there was the Douglas Skyhawk, a rugged and fast little delta-wing fighter and attack jet developed for the Navy. We praised the versatility of the A4D that could top Mach 1, carry an



A-bomb externally, and nest efficiently on the deck of a carrier.

■ Sequential flashing strobe lights made their debut on the approach light system to New York's Idlewild Airport, Pennsylvania, maker of the lights, called them Strobeacons. The 20 lights were spaced over 2,000 feet leading to the runway threshold.

■ Ah, the good old days. A TWA ad for its new Super-G Constellations showed passengers relaxing in the "Starlight Lounge" in an interior designed by world-famous Henry Dreyfuss. TWA said its Lockheeds were "the quiet-

est, most luxurious long-range airliners in the world!"

■ Our "Have You Seen?" section featured Cessna's brand new 182, the company's second model

with tricycle gear and steerable nose wheel. Another iconic airplane, the Fokker F-27, was also in development. The



F-27 would prove to be one of the most durable turboprop airliners ever built and was soon in service around the globe.

■ Think piston engines haven't improved? Chevron bragged that its RPM Aviation Oil was so good that at least one operator was getting 1,000 hours between major overhauls. ✈



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